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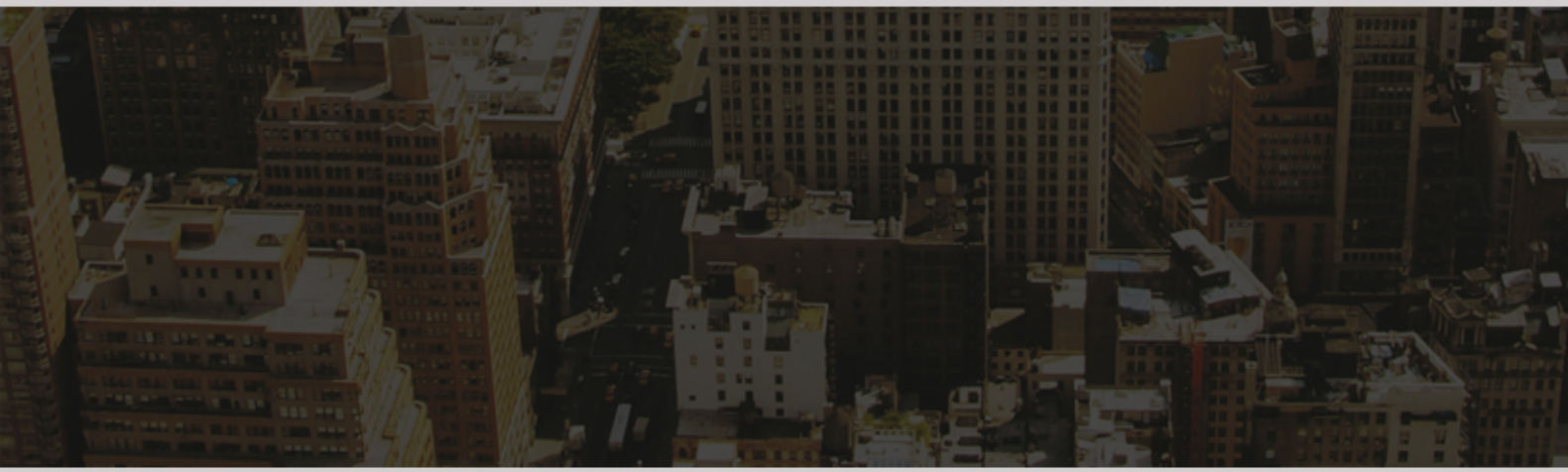

Health: The Design, Planning and Politics of How and Where We Live

AMPS CONFERENCE 11

Health: The Design, Planning and Politics of How and Where We Live.

AMPS, Architecture_MPS; University of the West of England
25—26 January, 2018

Health: The Design, Planning and Politics of How and Where We Live.

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INTRODUCTION

This publication is the product of the conference *Health: The Design, Planning and Politics of How and Where We Live* held at The University of the West of England in 2018. The conference was set in the context of what the World Health Organisation identifies the 'urban health threat': infectious diseases, noncommunicable diseases; and violence and injury from, amongst other things, road traffic. Within this tripartite structure of health in the built environment are many issues affecting both the developed and the developing worlds and the global north and south. In informal settlements the poor design and maintenance of sanitary systems is linked with TB, pneumonia and diarrhoeal disease. The industrial expansion of countries like China and India has increased urban pollution exponentially. In the UK, where this event was held, almost 2 million people live with sight loss. Obesity levels are at an all-time high. Dementia is increasing. Heart disease is linked to sedentary lifestyles and asthma has been connected with to traffic congestion. The conference and this publication is thus based on the argument that our health and how we live in our homes, streets, neighbouroods and cities cannot be divorced.

The publication, and the conference which it documents, were organised by the research organisation AMPS, its academic journal Architecture_MPS, and the Department of Architecture at The University of the West of England. It formed part of the AMPS program of events, *Housing – Critical Futures*.

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INDEX

HOUSE OF GENERATIONS

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INTRODUCTION

Today, only two percent of adult Danes live at the same address or road as their grown-up children, grandchildren or parents, but many more dream about doing so. A new Danish survey shows that one of three would like to live close or together with their relatives, and even more - 80 percent - see only benefits in living close to their family.

The Aarhus Municipality project "House of Generations" is a vision for creating a framework for relationships across all generations, for meaningful encounters and for rewarding neighbourliness.

Three of Aarhus Municipality's magistrate departments participate in the project: Health and Care, Children and Youth, and Social Conditions and Employment. A public housing association that provides student dorms also participates in the project.

The physical framework will be a building with a total area of approx. 25,000 m², located at Pier 4, at Aarhus' harbour areas.

The building will be a multi-generational house comprising a mixture of flexible public housing units for students, the elderly and residents who require care (elderly disabled people and people with acquired brain injuries). The building will be connected with common areas located in close proximity to where people live, a flexible day care centre (nursery and kindergarten) as well as common facilities, which also function as a community centre for the local area.

This paper shows how Studio Design and Social Innovation at Aarhus School of Architecture has, in conjunction with Aarhus Municipality, used design methods aimed at understanding and describing the needs of the user groups. The intention was to use the results in the subsequent building programme to be sure that the building and public spaces have the power to transform and improve how people work, learn and live.

House of Generations

Generationernes Hus (‘House of Generations’) is one of the most innovative projects of Aarhus Municipality to be implemented in the next few years. It is placed at Aarhus new urban harbour area. It is a project with a potential for innovation and for being a model example in respect to bridging the gap between generations and to bringing about new ways of thinking about organization in the context of living together with the local community. In House of Generations there will be care homes, student housing and a child care centre which will be housed under the same roof, and which will change the way

we usually think about building for different target groups
As part of the 2015 autumn semester study programme, *Studio Design and Social innovation*, from Aarhus School of Architecture, collaborated with Aarhus Municipality to better understand and create spaces of joy, inspiration and interaction between people in a unique and attractive way to children, parents, the elderly and families that go across generations.
The vision for House of Generations is to create a living and everyday framework for a good relationship between generations.
The focus is on the spontaneous meeting, the working community and the organized community. A daily framework for rewarding cohabitation between generations and the good relations between people, with a particular focus on ”meeting places” for all generations, with room for self-determination and independence.

Methods and proces

Before the architectural competition for House of Generations, Aarhus municipality would like to know how several generations can live together and what dreams, needs and wishes the different generations have for a community. Aarhus municipality wanted the process to be a democratic process of change in more ways than one: they wanted to use the outcome of the finished house to change the way children, adults, disabled people and the elderly live together in Denmark today.
Based in human well-being and contextual situations, Studio Design and Social Innovation works towards creating commitment and ownership in democratic processes of change. Human needs and the desire for participation and community are, consequently, central to both research and teaching. The common denominator for the academic focus of the studio is involvement and processes of cooperation involving users and citizens.
Co-creation, processes of co-production, and user involvement are all designations of a new supplementary method, in which users contribute to and are included in the architect's process.
It is precisely the role of the designer and the user in design that Johan Redström discusses in his article ‘Towards user design? On the shift from object to user as the subject of design’ (Redström 2006)[1]. He takes a critical stance to how the user, according to him, has in the past has been used to justify the designer's work. 'The user' is based on predictions rather than actual knowledge, and the designer tries to optimise the design to match this very prediction of the user. According to Redström, there is no real user in the design phase, but there are potential users. These users, even though they may be the actual future users of the design, may change their attitudes in the transition between the design process and the finished design - and this is where you, as designer, must pay special attention to how you use the knowledge you acquire from users during the design phase. (Redström 2006) “[…] Even if we work together with the people who will actually use the objects we are designing, we can only work with abstract notions of use and experience”(Redström 2006, p. 130).
According to both Löwgren and Stolterman [2], and Hallnäs and Redström [3], it is essential that you are aware of hermeneutical gaps.
Such gaps may occur between the empirical methods used in ethnography, anthropology, sociology, etc., and in design practice – disciplines which are based on interpretations and aesthetic choices. As long as you keep this in mind, there may, however, be many good reasons to look at what, for instance, ethnography can contribute to a process. For instance, the methods may provide the designer with knowledge of the context the artefacts are to be used in. They can be used for observing situations of use,

as the user's perception of the design is influenced by the context. And you may even make the designer design something for a user instead of for himself (Löwgren and Stolterman 2006).
Furthermore, there may be a more implicit benefit of involving users in the design process: that the user takes ownership of the product. If this is the case, the user, when the final design is finished, will feel that he or she has been involved in creating the project and will, consequently, be more inclined to like it. (Preece, et. al. 2002) [4]

What does it mean to live in a collective, neighbourhood or home share?

The first element was a research project in which a number of individuals and focus groups were interviewed. These represented the demographics which will be present in the future House of Generations in Aarhus Ø and included volunteers, students and senior citizens. The students set up workshops in which the structure of the workshop was a conversation based around three themes: everyday routines, social activities, and the home.
The questions were used as guidelines, and as inspiration for the conversation. We asked the informant to tell us about their lives, focusing on the main themes, and to focus on words and images that were important to them in their everyday routines.
First of all, we want to figure out the needs of our focus groups; we do so by mapping their everyday lives. Secondly, we are focusing on domesticity, the feeling of being home, and we do so by asking them questions about their home, their relations, activities, etc. And, last but not least, we focus on the social aspect and especially on the meeting - regardless whether it is with known or unknown people. We do so in the last page of the folder, where we ask the respondents to connect activities to either being private or public, and in some of the questions in the cards. Furthermore, we want to compare their circadian schedules to see if there are certain times during the day where their schemes overlap and thereby create an opportunity for interaction.

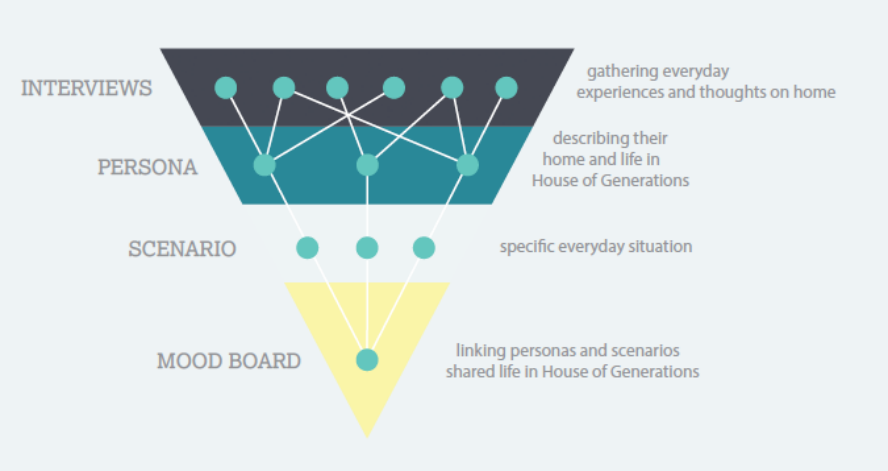

Figure 1. Process

Personas and scenarios

Based on the results from the workshop, we used personas and scenarios as a method to understand the users and daily life in the House of Generations. Personas were used as fictional characters created to represent the different user types in the House of Generations, and the scenarios helped us focus the design efforts on the user's requirements and dreams. Furthermore, we used scenarios to emphasise interfaces between user groups.

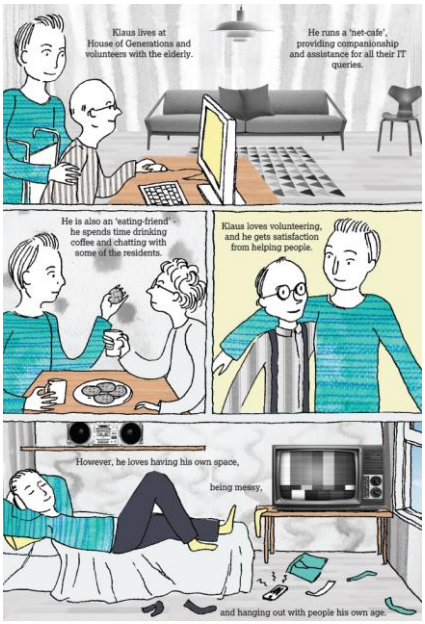

Figure 2. Persona Klaus, 22 years old, studies medicine at Aarhus University, single

Figure 3. Persona Inge, 72 years old, a retired teacher, volunteer at House of Generations, single

By comparing on a daily basis the rhythms of our target groups, we gained an overall understanding of time used in the House of Generations and of potential social encounters across generations.

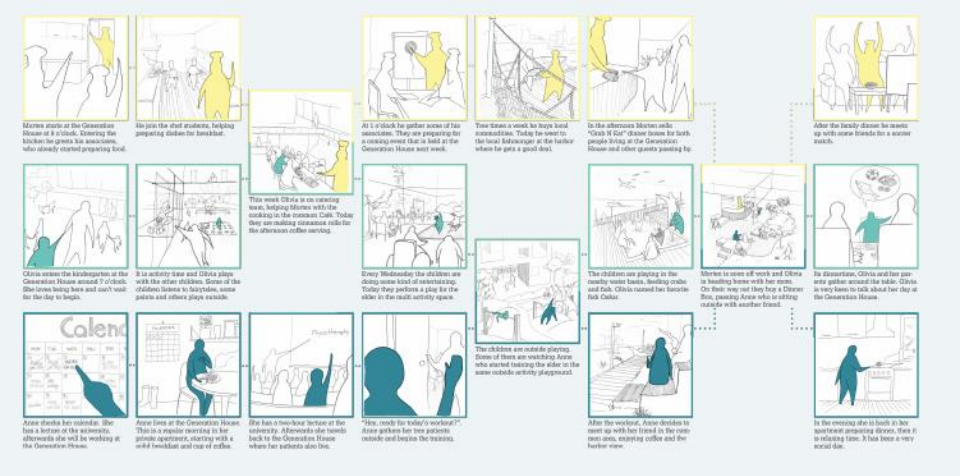

Figure 4. Scenario with overlap of activities

What we discovered was that people put an equally high value on time spent alone as on time spent with others – time spent cooking, socialising, playing and organising their shared spaces. These activities defined and shaped the idea of the home and the positive associations we have with the home – *hygge*, safety, well-being, family and love.

What was most important to successful and useful shared spaces was that people had contributed to making the spaces. One of the interviewees, Sidsel, is a 28-year-old mother who has recently finished Early Childhood Studies. She and her husband have previously lived in an apartment at Randers Bo- og Erhvervstræning - a secure home for young people with general or specific difficulties. Sidsel and Jon lived at Randers Bo- og Erhvervstræning for three years while they were studying. They did not pay any rent for their apartment. Instead they had specific tasks during the week, such as helping with cooking and cleaning, and being a support person for young people with difficulties.

She was very eloquent in sharing her memories of the shared spaces in the home:

The apartments and common areas reminded me of any other place people live. I really liked the couch area, because the furniture was like that of a real home. The residents once went shopping together to buy furnishings for the common areas, such as plants and pillows. They painted their own pictures and put them on the walls in the common spaces. These actions contributed to making the common areas feel like home. We often lit candles and watched movies together, or played a game. People would gather in the living space or the garden outside.

In some ways these enjoyable activities are an adult version of play; and they have similar positive effects on the lives of adults.

Private-public

A paradox is created by the fact that staff and children do not live at House of Generations, but rather, move in, out and between it several times a day. This creates a hybrid between the private home and the

public realm. What is interesting is that as these people move between their private spaces to a public space, they are co-mingling and creating relationships with others in House of Generations.
Each of the individuals who enter the House of Generations has an impact on the social life in the house. Likewise, they affect others. Everybody brings something to the house end takes something home, in the sense of interaction, experience and exchange in a physical and psychological way.
Each persona has a special circadian rhythm. After discovering the connection between private and public, it became clear that a lot of time is spent in the public forum. By comparing on a daily basis the rhythms of our target groups, we gained an overall understanding of time used in the House of Generations and of potential social encounters across generations.

Neighbours

Besides the specific target groups of staff and children, we discovered a secondary group: the neighbours. This group is inclined to use the House of Generations, either because they have to or because they are attracted by pleasurable activities such as eating in the cafe, visiting friends, access to the harbour or recreational activities. Others are motivated by more fundamental demands, such as picking up children or visiting grandparents at the old people's home. By acquiring an improved understanding of the neighbours and their lifestyles, we can make House of Generations a destination they visit not just because they need to, but because it is fun and a valuable aspect of their everyday lives.

Figure 5. Location and Neighbours

Different kinds of spaces

It was very important for us to create a space of fellowship which could be used for formal and informal programmes.
The book *Discourses in Place: Language in the Material World by Scollon and Scollon* [5] was useful for thinking about how people share space and signal their presence, both deliberately and unconsciously. As Scollon and Scollon assert, there are (at least) 11 kinds of interactions: singles, withs, files and

processions, queues, contacts, service encounters, conversation, meetings, people-processing, platform events, celebrative occasions - we needed to consider which of these would be appropriate for House of Generations and how to preference, encourage and embrace those interactions.
Scollon and Scollon also describe the five different kinds of perceptual spaces (visual, auditory, olfactory, thermal and tactile) and different elements of how we experience time
(urgency, monochronism-polychronism, activity, variety), which became important aspects of human interaction to consider in the various atmospheres and threshold spaces of the project.

Common areas – Cafe and Multibox

The common cafe is one of the central spaces of the house, the heart of the building, where residents, neighbours and guests gather and meet. This space must be able to draw in and entertain ”neighbours” who do not live in the complex as well as those who do. There should be a smooth transition from the indoor space to the canals and the water outside; this may be achieved by altering the facade or by making visual connections by means of texture. The harbour should be an inspiration for the creation of the physical and psychological environment of the space, so that the cafe can harvest crops, children can play, and people can exercise and enjoy life at the harbour - all at the same time. The common cafe should be an active space during the day - a place where day-care children can learn about food and cooking, a place where the elderly can socialise and enjoy themselves, with or without food, as well as a place young people might use for studying.

Figure 6. Moodboard The common café

The Multibox is a space that can be used in multiple ways, at different times of the day. Its strength is its variability and adaption to the everyday environment, and in that respect it must be able to transform to accommodate large as well as small-scale activities or events. This may be possible by having different zones that can expand or contract. It should be possible to open up the space towards the outdoor areas to allow different type of activities. It must be easy to break down into smaller units, allowing for a quiet space. The tactility must be carefully considered, while it should accommodate everyone’s needs -

children playing and jumping around need a warm and soft environment, elderly people who are not very mobile need safe surfaces, likewise, it must accommodate the needs of the disabled.
The chef, the physiotherapist, as well as the kindergarten, can benefit from having access to this space. It can be used as a training facility for the elderly and disabled, a space for children during joint activities, and it should provide a setting for larger events hosted by one of the residents or for important occasions such as weddings, baptisms, conferences, etc., organised by the common cafe.

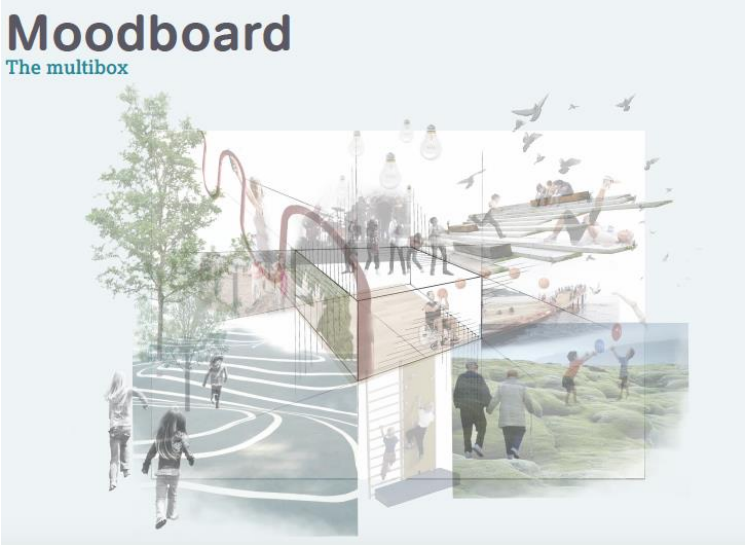

Figure 7. Moodboard The Multibox

Research material

We have handed over to the Municipality our user involvement process and innovation process, including personas distributed between three areas with different characteristics. Consequently, all relevant primary "user types" (employees, volunteers, residents - the young and the old, singles, and families) have been interviewed. The stories of their lives and the interests they set down on paper helped illustrate the opportunities that arise from having several generations living, working and staying in a building at the same time and from giving them the opportunity to take advantage of being part of a large community. In the future process, this will be an extremely important aspect of the efforts to create an understanding of what the intentions of the municipality for the house is - for internal cooperation among builders, but, in particular, externally: aimed at the participants of the competition, the future users of the house, the citizens of Aarhus, and others with an interest in the House of Generations project.

A different building programme

The needs analysis that was created was reflected by how the building programme and tender documents were designed differently from a traditional programme. The programme described the relationships between the people who would be living in the building and the desired connections between workflows and spaces. Consequently, it was a programme that incorporated some of the 'soft' human relations and transformed them into spatial requirements. The programme also dealt with the kinds of moods the spaces were supposed to promote in relation to the work that is to be carried out in them. The descriptions of

relations were supplemented by the entire traditional programme as we know it. A programme which is fact based and lists some of the things the entrants will be asked to come up with proposals for.
The entrants were able to formulate proposals for solutions and visions in a different way than they are used to. This allowed them to open up the space of opportunities, compared with traditional competitions.

The winning project

The proposal consists of closely assembled building bodies in 3-9 floors, which with varying exterior facade materials appear scalable and varied. It gives the humanity, which is the DNA of the project itself. From the arrival entrance there is direct access to the harbor channels from floating pontoons, so that the water is used actively by the building's users. There are workshops, studios, educational "laboratories" and common living areas as the framework for the social life of the building.

Figure 7: Facade
Rendering by winning architects: KPF Arkitekter AS

Figure 8: Studio and orangery.
Rendering by winning architects: KPF Arkitekter AS

Figure 9: The space that connects the day-care institutions
Rendering by winning Architects: KPF Arkitekter A/S

Concluding remarks

User involvement has the potential to influence a process and the outcome positively if the process is anchored in the management (in this case: Aarhus Municipality) and if the management is able to articulate a vision for where they want the change to take them. If you skip the user involvement phase, the visions of management quickly become an exclusively organisational project that is not connected with spaces, and which is perhaps no longer connected with relations between people, or with specific actions in everyday life.

User involvement in architecture is about involving users in processes that reveal the future uses of spaces - the relations we need to succeed in creating and the moods spaces should promote and support. When this is accomplished, professional consultants, architects and engineers can begin designing spaces that promote both interaction and autonomy - today as well as in the future - and based on the perspectives outlined by the users.

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SCREENING HUMAN LIFE – THE LEGAL AND ETHICAL IMPLICATIONS OF NON-INVASIVE PRENATAL TESTING

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INTRODUCTION

We now have easy and low risk tests that can be undertaken at an early stage of pregnancy that can yield a range of information about the future child. This technology is known as non-invasive prenatal testing (NIPT) and can provide parents with accurate information about the health or disability of the developing child. It also has the potential to yield uncertain and trivial data, or information that has no immediate clinical purpose. This paper examines the aims and public narratives associated with this technology, and the disruptive potential of these tests in ethical and regulatory terms as they are released into a global village. It also explicitly considers how and where we live (and access services) impacts on parental decision making and the evolution of these tests.

This paper is developed in eight parts. In part one, we address conventional reproductive screening and diagnostic testing and the introduction of NIPT. In part two, we examine the aims and public narratives associated with this technology. In part three, we consider the implementation of these tests on the domestic and global stage. In part four, we examine the disruptive quality of this technology, before moving on to examine (in part five) how socio-economic and global factors may influence parental decision making and the future implementation of these tests. In part six, we look forward and consider possible pressure points and challenges arising from environmental, political and societal changes. In part seven, we evaluate possible regulatory responses, before making some closing remarks about the type of future society that we want to create.

PREGNANCY SCREENING AND NIPT

In many countries, conventional combined screening - the process of identifying whether a fetus has an increased chance of having a condition – involves the use of maternal serum tests and ultrasound imaging and is a routine part of prenatal care during the early/ mid-stages of a pregnancy. These tests have relatively high false positive rates, and further invasive tests (amniocentesis or chorionic villus sampling) are required for a diagnostic result. The invasive tests carry an increased risk of miscarriage (about 1%[1]) and require a certain skillset that may not be freely available in low resource States. Researchers have therefore looked for safer and reliable alternatives for establishing the likelihood of specific birth outcomes.

NIPT technology was first introduced for aneuploidy detection in about 2011 – utilising the discovery of circulating cell free fetal DNA in the maternal blood stream - and has been swiftly developed and

exploited by the commercial sector as a clinical offering across the globe.[2] NIPT is now available through private sector providers in over 60 countries.[3]

These tests involve the taking of a maternal blood sample during the early stages of pregnancy. There is no physical risk to the pregnancy or the fetus. The sample is then subject to laboratory analysis using the cell-free fetal DNA in the maternal blood. The analysis can provide a range of information about the developing fetus including the likelihood of aneuploidy or other anomalous genetic condition. It can also provide secondary findings about the pregnant woman. In some cases, the laboratory analysis can be undertaken at an earlier stage than conventional screening and invasive testing. Early and safer testing is prima facie advance but, as with any technology, we should be cautious about implementation. The accuracy and quality of the information produced varies from the diagnostic (eg some inherited genetic conditions, fetal sex and rhesus D status (called NIPD)), to near diagnostic (eg Down Syndrome where the sensitivity and specificity rates have been demonstrated to be greater than 95%[4]), to variable and uncertain in terms of future outcome (eg chromosomal micro deletions and micro duplications[5]). NIPT also has the potential to provide a range of non-health related information, and whole human genome testing/ exome sequencing has been demonstrated in a research setting.[6] This mixed pattern of accuracy, the potential to generate large datasets and risk-based/ equivocal information is potentially problematic for stakeholders (including parents, clinicians and regulators). Against this background, it is generally agreed that non-directive counselling is required to inform the testing process.[7]

PUBLIC NARRATIVES

'Reproductive autonomy' and 'public health' have become the predominant narratives associated with the aims and purposes of NIPT,[8] and some commentators see them as "competing and largely irreconcilable rationales".[9] However, these approaches tend to conceptualise the narratives narrowly and obscure the practical reality of implementation and use. 'Reproductive autonomy' frames NIPT as a facilitator and enhancer of parental (and specifically maternal) autonomy by providing information and informing choices about the pregnancy. Information about the unborn child may help parents decide whether to continue with or terminate the pregnancy. In this narrative, testing ought to relate to the exercise of autonomous decision-making – in other words, the information sought should facilitate possible decisions about the pregnancy.[10] However, it can be argued that the physical and psychological well-being of the mother is so inextricably connected to her unborn child, that there is a plausible basis for asserting a qualified right to know even trivial and non-health information that the pregnant woman attaches significance too.[11]

The autonomy narrative rests on the foundation that maternal and parental choices are free and informed, and is about emphasising and prioritising individual preferences and values. [12] This may be significant in cultural contexts that do not prioritise individual autonomy. Further being 'free' necessitates an absence of undue influence/ pressure on the decision-maker and on the choices made using the results. Being 'informed' requires that the parents have adequate information about the tests, the test conditions/traits and what the results mean. These requirements are challenging given the complexity of genetic risk and the range of information that could be available to us in near future. The presentation of pregnant women as "choice makers" is also problematic because it makes certain assumptions about the decision-making process that are not necessarily borne out in practice and in cultural contexts.[13]

The 'public health' narrative focuses on broader societal considerations, either promotion of a consequential public health benefit or the avoidance of some consequential public harm. In its

narrowest form, testing is the means to prevent something – a trait, condition or characteristic - that is unwanted. This is relatively unproblematic in the case of treatable conditions – where testing could inform, enable or facilitate measures aimed at improving the health or outcomes for the fetus. Currently, there are few examples of these types of condition (eg rhesus status and female congenital adrenal hyperplasia) but the opportunities for effective in-utero treatment are likely to expand in the future. However, the explicit improvement of public health through the removal of unwanted life is rarely articulated, and is frequently resisted ethically for anomaly and non-health testing.[14] Such arguments raise discriminatory and eugenic concerns[15] and therefore policymakers tend to emphasise the autonomy narrative instead.

In relation to anomaly testing, Ravitsky argues that "the only options available to most women following prenatal diagnosis of a serious disability or health condition are termination of the pregnancy or preparation for the arrival of a child with special needs or health challenges."[16] This argument rests on a stark presentation of choice. Some parents may have no desire to act - knowing something, even unplanned news, may still be wanted[17] - and testing can produce reassurance or some degree of certainty. The statement also presupposes that testing is limited to serious disabilities or conditions where lawful options to terminate are available.[18] In relation to non-health traits or minor disability, there may be no lawful choice for the parents to make. Even if there are lawful options, they may not be actionable because of parental values and beliefs.[19]

There are reasons why public health considerations might feature in relation to fetal anomaly testing and justify state intervention and the qualification of 'autonomy'. NIPT "can reduce adverse pregnancy outcomes by limiting the number of unnecessary invasive tests and the accompanying risks and parental anxiety associated with these tests. Advance knowledge may help prepare families psychologically and physically for the birth of a child with disability. The ability to identify disability or conditions accurately could have a role to play in public health planning and the distribution of future State resources. The potential benefits of a publicly funded scheme might include central coordination and greater quality control over testing. Specific public funding of NIPT would also remove the current inequity for those who cannot afford the expense of private testing."[20] Other considerations might include the avoidance of discrimination/ stigmatisation of disability,[21] the spectre of the designer baby and the regulation of patient care.[22] NIPT shines a spotlight on the liminal status of the developing child and is clearly associated with the abortion debate.[23] Global commercial context and precautionary reasoning may also legitimize some limited State intervention.[24/25]

IMPLEMENTATION

The UK NHS operates NIPD in relation to certain genetic conditions and fetal sex determination is only available when linked to a specific condition.[26] The UK National Screening Committee recommended an evaluative rollout of NIPT as a contingent test for Down, Edwards' and Patau syndromes in early 2016 – as an intermediate step between conventional screening and the diagnostic tests. NIPT will only be offered within the fetal anomaly screening programme where conventional screening has highlighted a risk greater than one: one-hundred and fifty, and full implementation is scheduled for 2018. There are a wider range of test options, including fetal sex determination, available in the private sector,[27] and some NHS hospitals are already facilitating private testing using NHS Cytogenetic labs.[28]

There has been inconsistent global implementation of NIPT, but the commercial application/ promotion and simplicity of sampling makes health tourism feasible. The internet provides a platform

for information about and promotion of the tests/ conditions – some of it reliable and some less so – making it difficult to identify trustworthy sources.[29] Although the manufacture and sale of tests kits in the UK are regulated,[30] control may not extend to testing outside the EU where many commercial providers operate. Therefore, the environment in which NIPT has been launched makes effective regulatory intervention challenging.[31]

DISRUPTIVE QUALITY

Like any new technology, there is the potential to disrupt existing societal, ethical and regulatory frameworks in positive and negative ways. NIPT presents a prima facie advance for reproductive management and choice, but the simplicity and safety of the sampling process may well prove to be an 'achilles' heel'. Protecting autonomy requires careful handling of the consent process and this requires time and resources to accommodate variations in education, intelligence and language. There is already evidence that informed consent is being neglected in conventional screening tests.[32] If the range of tests is expanded, and NIPT becomes just another blood test, this will only exacerbate the situation. There is the risk of premature adoption by parents – where test results are treated as diagnostic when they are not.[33] Normalisation within screening programmes may make it harder for women to make informed choices about testing; and pressure from researchers to implement these tests as a technical gain (irrespective of patient autonomy) should not be underestimated.[34]

Publicly funded environments also promote the tests,[35] and this puts pressure on decision-making generally. It has been argued that NIPT has the potential to lower acceptable thresholds around certain kinds of life, as well as expressing "hurtful" attitudes/ messages to people living with those traits.[36] More information does not necessarily equate with better choices, especially if outcomes are uncertain and results unreliable and hard to interpret.[37] There is also an unmistakeable shift from ex post responses (to remedy, accommodate, prepare etc) to ex ante prevention of certain forms of life, and this adds to the pressure on parents when making decisions. Apart from the obvious risks associated with a 'genomic future', the dramatic evolution of technology creates practical problems during implementation - increasing levels of information (particularly in relation to conditions with variable outcomes) are likely to require extra support and sophistication from genetic counsellors. Keeping those services sufficiently in touch with the evolving technology may be challenging and expensive for providers.[38]

These tests also provoke a tension between the informational interests of pregnant women in making informed choices (including having information about their baby) and the interest of future persons (the subject of testing if born) in deciding what genetic information should be available to others. Increased genetic data is likely to put pressure on conventional notions of privacy and generate practical problems for resourcing and managing any right to know or not know.[39]

SOCIO-ECONOMIC FACTORS

There is tendency for the autonomy narrative to ignore "the unequal way these choices affect women with different socioeconomic resources in different political contexts, especially in societies without a strong social welfare safety net."[40] To examine how these factors may influence parental decision-making and implementation, we shall concentrate on three specific areas: a) test access, b) information/ results and c) post-test choices. In relation to a), parental access may be dependent on location – not just which State but also where they live within a State. There is certainly evidence of

urban and rural variation in terms of NIPT access in low resource countries.[41] The affordability of tests will impact uptake and discrepant availability and cost variation[42] may have a ripple effect on equality of access and health tourism. In relation to b, concern has already been expressed about the reliability of online sources,[43] the reading age required for some promotional material,[44] and language/ education barriers to access.[45] In relation to c, choices may be influenced by family resources (ie the affordability of raising a child with disability) and are likely to be shaped by available State support. Current and foreseeable living environments and family size may also influence parental decision making in this context. The acceptability and stigma attached to raising a child with disability may be influenced by local conditions as well as religious factors. Mozersky et al. have highlighted the danger of unitary global policies[46] and the limits of individual autonomy, especially where lawful abortion is severely restricted.[47] Not all societies place the same weight and values on individual autonomy – for example, there are different cultural perspectives about sex selection that extend from unacceptable discrimination to legitimate 'family balancing'.[48] There are also different societal thresholds for disability and prevalence of genetic variation,[49] producing different State priorities and inevitable global variations around NIPT. National and professional resources (eg availability of public funding, insurance and genetic counsellors) may also be important.[50]

PRESSURE AND CHALLENGES

Whilst, we cannot exclude public health considerations from anomaly and non-health related testing, they may be hidden under the guise of 'autonomy' and impede the realisation of reproductive choice.[51] As the range of testable conditions/ traits increase, availability is likely to put consent processes under pressure in public health regimes operating with finite resources. Population growth[52] will add to the pressure on scarce resources potentially impacting on services supporting individuals with disability. Significant growth in the global commercial market is predicted,[53] cross border access may be difficult to stop and commercial exploitation all have the potential to undermine patient autonomy. If more test options are made available, parents may find it hard to resist the urge to test, even for traits unactionable by lawful means. Western law increasingly places emphasis on patient rights[54] and we have argued elsewhere that there is a plausible argument for a mother to claim a qualified right to know information about her developing child.[55] This backdrop appears bleak but if a eugenic future is to be resisted, we need to think very carefully about how we implement and regulate expansion of this technology. If a State cannot guarantee parental autonomy, it should not promote policies using this narrative. Whilst Ravitsky has suggested that a range of social policies could be used to underpin autonomy,[56] we are more sceptical about the effectiveness of such measures where pressure due to limited space, resources and commercial greed persist.[57] Equally, if public health considerations underpin the offer of testing, they need to be put front and centre in the narrative.

POSSIBLE REGULATORY RESPONSES[58]

Faced with these predictions, domestic regulators might adopt mandatory (negative) legal rules and guidelines against all NIPT services into a jurisdiction. These rules might provide for the licensing of NIPT with specific requirements relating to advertising, access, counselling, scope etc.[59] However, positive forms of regulation may be more effective, and States should consider informational

mechanisms including renewable certification of NIPT websites, online forums and related services[60] and 'internet prescriptions' (where doctors highlight 'approved' online sources of information/ support about these tests). National guidance could be circulated to NIPT suppliers within a jurisdiction.[61] Organisational and incentive policy instruments may also assist - public funding could squeeze the private sector although this would depend on the degree of service equivalence and have significant resource implications for States. If post-birth concerns about information are to be addressed, we need a regulatory framework that makes provision for the storage, security and future destruction of important personal data (including genetic data) and that takes an acceptable position on any right to know and not to know. We are less optimistic about the effectiveness of international regulatory efforts, but the use of chokepoints, local asset enforcement and reciprocal cross border enforcement/co-operation might be warranted.[62]

CONCLUSIONS

Whilst eugenic and discriminatory outcomes need to be resisted, we must lower our expectations about the effectiveness of policies that seek to regulate reproductive choices in the global village. Although the march towards greater reproductive rights and access to genetic information may be hard to roll back, we do need to be honest and transparent about the limits of autonomy as a rationale for genetic testing. There is plainly a risk that the pursuit of greater reproductive choice may end up impeding the very rights we seek to enhance. Whilst the desire to embrace greater reproductive choice is understandable, we need to acknowledge and act upon the issues we are creating for future generations.

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IN PURSUIT OF A HEALTHY CITY: BOUÇA HOUSING COMPLEX BY ÁLVARO SIZA (1977), A LESSON TO RETAIN.

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INTRODUCTION

Being interested in improving the physical and mental well-being of an urban society means, above all, being concerned about the state of health of people and their cities. If we believe that health results mainly from the influence of the physical and social environments, which promotes a certain lifestyle, then the role of the city in generating health is extremely relevant. However, we are also aware that a healthy city requires more than just good health care services, decent houses and safe surroundings. It also has to provide people a variety of experiences and resources, safety and accessibilities.

If a community is a social unit with something in common, such as values or identity, a location-based community (also called community of place) – which implies being situated in a given geographical place, like a neighbourhood, i.e., living in close proximity – enables important social ties through sharing a sense of place. As it is known, the word community comes from the Latin “communitas” meaning “public-spirit”, and also from “communis”, which means “shared in common". Daniel Kemmis, in *Community and the Politics of Place*[1], argues that the loss of capacity for public life (which inhibits our ability to solve crucial issues) is related to the loss of a sense of place. He claims the urgent need of a renewed sense of inhabitation, of community rooted in “a place” and of people dwelling in “that place”, which can shape politics into a more cooperative and more humanly-satisfying enterprise, forming better people, better communities, and better places. Somehow, a sense of community offers many appealing features of a broader social relationship: safety, familiarity, support and loyalties. So, concerning a healthy city, isn’t community also a relevant criteria?

In the Social Sciences, the field of analysis about the city and the urban is vast and discusses invariably the need to comprehend urbanization as a social construct. If the city is the stage of collective life, the appropriation of its public spaces reveals, somehow, the reflection of social interactions, networks of power and domination, and reflect its social tensions. Consequently, the configuration of space has a determining role in the way its inhabitants appropriate it. Space practices exist in the domain of sensation, i.e., in the way people perceive space individually, hence they are subjective. But, on the other hand, the space of representation of the inhabitants conforms the living space, representing the field of intervention and action. They result from an ideological production. So, *“it is pertinent the consideration of the existence of a dialectic relation between the spacial structure and the social structure and of the connection between spatial configurations and collective identities.”*[2]

The Bouça Housing Complex was designed by Álvaro Siza (1977) after the Portuguese Revolution of 1974, promoted by an organization called *Serviço de Apoio Ambulatorio Local* (SAAL) that was formed to seek state aid to reduce poor housing conditions in Portugal. This social housing program aimed to accommodate poor people, mostly country people that were living in slums. Nearby a commercial centre of Porto (Boavista), four parallel rows of four-story blocks (composed by two duplex-dwellings fixed in high) are interspersed with open-air terraces, forming four narrow courtyards. They are all attached to a perpendicular thick wall, which works as the gateway of the metro station, a kind of corridor of distribution, but also as a sound barrier against the metro (along the original tracks of the old railway train). To complete the ends of the rows, defining entrances to the landscaped courtyards between rows, there are four free-standing community buildings facing the streets, giving to this dwelling complex a more urban character.
The conception of the project was made through a long participation process, a "patient dialogue". The future inhabitants became participants in the project act, dealing directly with the architect, who tried to integrate and fulfil their needs and desires, while bearing in mind the available budget for the operation. In these circumstances, Siza designed 130 individual houses (two-story apartments), which was a particularly contentious issue, seemingly incompatible with its economic limitations. Actually, the architect had the support of the original occupants, right from the beginning, managing a housing solution that's still a success. After several stages of constructions and rehabilitations along four decades, it is also inhabited nowadays by middle class families and young people, living together among the old inhabitants, sharing a sense of place. So we wonder: what has its architecture got to do with it? What is the real meaning of neighbourliness, concerning urban health? How can housing achieve it? What are the available mechanisms, from the architectural point of view, to contribute to a healthy city?
In this paper, we state five main points that may help us to understand this particular case:

1. Centrality.

The place of the housing complex implantation, in that particular part of the city, has proved itself crucial. Being nearby a commercial centre with easy access to groceries, chemist's shop, restaurants, bars, cafes, shopping centres, schools, hospitals, cultural facilities, public utilities, administration services and all a city can supply, is absolutely relevant. The chance of building it close to city centre, instead of locating the housing complex in the surround of the city, eventually on a proper dwelling zone, come out essential. Probably, the most pertinent quality of that place is the fact that is located in heart of the city.
Here, by *centrality* we mean the easy relation with the city, fuelling urban life, enabling benefit from it in a useful and healthy way. It may not be a strictly architectural decision (it's more related to political and economic issues), but it has, undoubtedly, huge repercussion on its architecture.

Figure 1. ***Centrality*** *[implantation]*

2. Fluidity

The relationship to the context is also very important regarding, not only transports accessibility, having easy access to all kinds of public transports and easy connection by car, being close to the main road network, but also promoting public crossings by foot, namely permitting shortcut for those who use the (Lapa) metro station.

Parallel to the metro line, Siza draw a thick concrete wall of distribution that frames the whole complex. There, several gates (in the both levels) link directly to the galleries and courtyards, simplifying the connections for its inhabitants, as well as streamlining the connections with the city, allowing a public crossings for those who just need to pass through the complex in a quick and efficient way.

Here, by *fluidity* we mean not being closed to itself, self-contained, avoiding the limitation of connections just to its own inhabitants. It means being open to the city, allowing public crossings and, consequently, a greater transparency, permeability, urbanity, giving to this housing complex a less "ghetto" character.

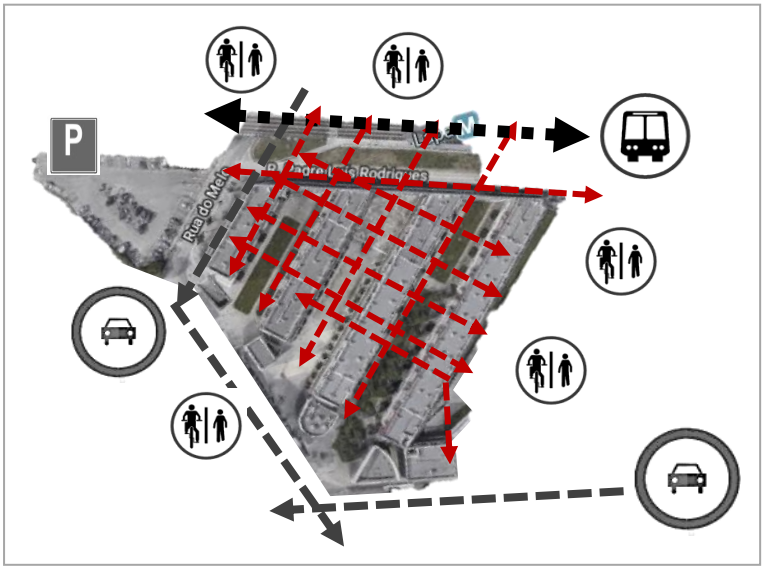

Figure 2. ***Fluidity*** *[context]*

3. Communicability

Regarding the built environment, this double duplex-apartments typology in a row shares the access of the upper houses through upper galleries (a sort of corridors of distribution). But, on the other hand, the houses based on the ground-floor has direct access from the courtyards, framed by landscaped spaces (kind of open patios) that are also common, social and public spaces. Being forced to share these spaces, the inhabitants can just pass through it, play around or communicate. But somehow, it increases a community spirit, being able to provide more mutual support, creating a renovated neighbourhood atmosphere.

Even more, the site circulation pattern brought about by the public passage through the courtyards to the metro station, formed a proper relationship between buildings and courtyards. In a way, all these access system works against isolation and individuality.

Here, by *communicability* we mean face-to-face practice of public life. Somehow, these Siza's project decisions decrease isolation, compelling interconnections and communications between its inhabitants, fostering the spirit of community.

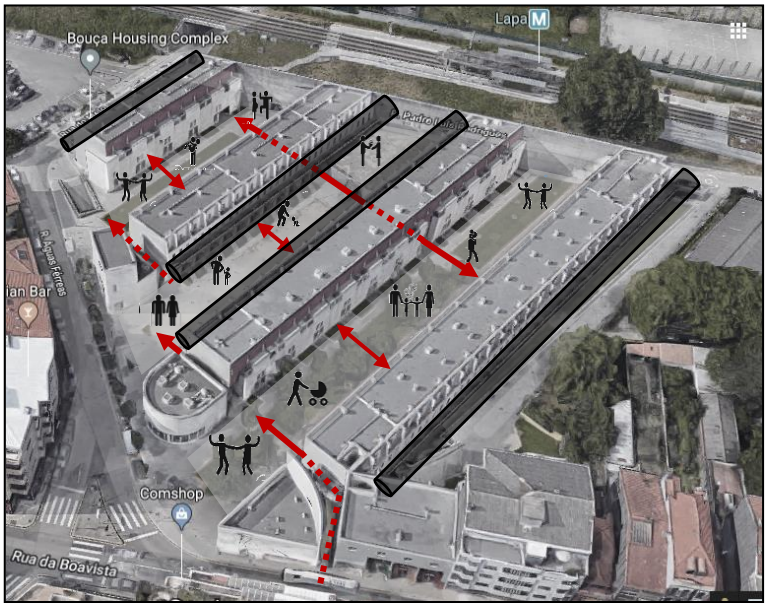

Figure 3. ***Communicability*** *[typology]*

4. Diversity

Concerning the inhabitants, it all begun with just one low social stratum (a poor and uneducated community), but on the latest stages of construction it was opened to other kinds of population. *"When all the work was concluded, the market reaction showed that the type of housing not only did not entirely correspond to the current trends in the demand for economic housing – for better or for worse – but also, on the other hand, they were attractive to other sectors of the population: students, young professionals, newly formed families – protagonists of the mobility characteristic of the contemporary city (...),"*[3] wrote Siza on the 12th of September of 2006.

In fact, these economical typologies are well dimensioned, having flexible spaces, also proper for a home-office but, above all, they have the privilege of being a two-level dwelling, which is ideal for the new generations. Actually, the original residents kept their apartments, but now there are the old poor tenants and new middle-class residents; old couples mixed with new couple with children; or just single people living alone or with partners, but with more levels of education (architects, designers, artists, university students), living in the same neighbourhood, having a more comprehensive kind of population, eluding any type of discrimination, inducing to a more reasonable and balanced social structure.

The change in the economic and demographic nature of the new occupants suggest a more healthy relation between the inhabitants and the housing complex (people vs building), making it easier to camouflage people's social background, allowing them to adopt another lifestyle characteristic, reducing their poverty stigma, regardless of their social background or education levels.

Here, by *diversity* we mean the mix-stratification of the inhabitants, living all together, as an important factor of the maintenance of a balanced housing complex. From the architectural point of view, the quality of its typologies are relevant to attract all kinds of residents.

Figure 4. ***Diversity*** *[inhabitant]*

5. Identity

What had been an example of emergency housing for poor residents is now seen as a model for residential development in the city. The fact that the project has the signature of Álvaro Siza, a famous architect (an icon of the Portuguese architecture), gives it more attractiveness. Siza's reputation had grown when he won the Pritzker Prize in 1992. Since then, his buildings gained a new status, and Bouça was no exception. Consequently, more people (namely young architects) who recognize and identify the architectural qualities of the author, longed to live there too. And it happened, indeed!

Nowadays, this housing complex has character and some landmarks, which creates a sense of place and identity. Somehow it had acquired a community atmosphere, consolidating the concept of neighbourhood. A good example is the Saint John' night (the patron saint of the city). On that night, all the inhabitants get together on the courtyards to organise this this gathering. They drink, eat, dance, and play around all night long, all together like a real community. And this is an amazing event that happens every years, which is really uncommon in any contemporary urban society.

Here, by *identity* we mean the feeling of "belonging", achieved by the relation between the people and the built environment, its architecture and place. When the notion of neighbourhood gains a new meaning as a space-symbol, involving several social qualities that powers the concept of a healthy city.

Figure 5. Identity [neighbourhood]

CONCLUDING REMARKS

It is probably easy to find several problems and flaws in this project, especially if we have in mind that it has existed for forty years now and that it was made under substantial controlled costs. For instance, the stairs are the main solution for communication between levels, there is no ramps or any elevator

system, but that was considered normal at the time and now the new inhabitants are pretty aware of this lack when they choose this houses to live in. Nonetheless, one thing we know for fact: the Bouça Housing Complex wisely passed the test of time, surviving almost intact, aside from some inevitable repairs needed after all these years of intensive use. Nowadays it is a renovated neighbourhood with character and identity. On the 12th of September of 2006, Siza wrote: *"It is not a perfect work. But is that the main thing?"* [4]

So, after analysing each point, what are the lessons to retain?

Through *centrality* [implantation], an easy relation with the city is guaranteed, encouraging urban life, enabling people to benefit from it in a useful and healthy way. Promoting *fluidity* [context] avoids being closed to itself, self-contained, dodging the limitation of connections just between its own inhabitants. It means being open to the city, allowing public crossings, and greater transparency, permeability, urbanity, giving to the housing complex a less "ghetto" character. Evoking *communicability* [typology] it encourages face-to-face practice of public life, inducing to a less isolation, promoting natural interactions among people, compelling interconnections and communications. Endorsing *diversity* [inhabitants] implies a mix-stratification of its inhabitants, living side by side, guaranteeing a greater socio-economic stability that can be reflected namely in the conservation of the common spaces of the housing complex. Nourishing *identity* [neighbourhood] it helps to gain a sense of safety, familiarity and support between the inhabitants.

Probably, blending it all together, having all these factors in consideration was the best solution, or at least, we believe it contributed for the success of this Housing Complex, after all these years. Now it belongs to the city and plays a role in a pro-active way. So, as a stage of social life, it underwrites a healthy city solution. And probably this is as far as a housing project can go, concerning the architectural practice.

To sum up, we believe that all of this induces the concept of neighbourhood, the feeling of identity, the sense of community, leading to less isolation, so to a healthy solution. In this paper we intended to reflect about the main decisions of this example, by Álvaro Siza, to enhance the importance of the relationship between the physical and the social environment, promoting connectedness and neighbourliness as parameters that embody a likely solution to ease some problems associated with health and the built environment, seeking a better understanding of the interconnectedness and potential of it, gauging the role of architecture in our contemporary society.

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THERAPEUTIC ENVIRONMENTS: ARCHITECTURE AND WELLBEING

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INTRODUCTION

In this paper we ask if architecture, urban space and landscape architecture can have therapeutic healing properties? Against the background of increasing awareness of mental illness, we are turning to the designers of the built environment to respond. We argue that we need to design and build internal and external environments that support people, especially when they are vulnerable, ill or in recovery. We argue, that the voices of users and patients must be heard. Therapeutic environments need to go beyond the functional. We suggest that many buildings are inappropriately clinical, in scale, in fittings, furnishings and ambiance. We need socially appropriate buildings that facilitate recovery and promote good mental health and wellbeing.

A common view is that the concept of a therapeutic environment reflects the opposite of the "sick building" syndrome. Is a neutral environment actually achievable, one that does not influence the occupants in either a sickening or healing way? Or does every environment have an effect?

DEFINITION OF THERAPEUTIC ENVIRONMENTS

The term therapeutic has several meanings. The primary classical meaning is worship of the gods and attention to the arts including architecture. Another meaning is to be involved in politics and the art of the possible. Finally, the work of the medical person and the work of healing and helping to heal is known as therapy (Dr Malcolm Rigler, GP, FRSPH, Patients Association Ambassador).

THERAPEUTIC CASE STUDIES

We present and explore the nature of therapeutic environments through case studies based on interdisciplinary approaches to design and based on teamwork and skills in all aspects of the built environment. Therapeutic design is based on care and understanding within a culture of innovation in product and process.

MICRO SCALE

CASE STUDY 1 - CONNECTING MINDS THROUGH SANDPLAY – DESIGN FOR DEMENTIA

Jungian Creative Play, Memory and Senses

Jung was able to heal himself during a period of disorientation through the use of symbolic play, constructing a village using stones, mud and water on the banks of a lake, just as he had done as a

child. In his building games, the creation of spontaneous imagery helped clarify his thoughts and released streams of fantasies.

Sandplay is a game aimed at encouraging creative lateral thinking, sensory awareness and memory recall. The game could apply to all people with or without dementia. Memories are the building blocks of our sensory mind. We all have our own memories held within different objects, we can rediscover them in play. Jungian Sandplay can become art therapy for tactile and visual image making.

Sandplay uses a shallow tray painted blue inside to represent water, or sky, filled with sand. Nearby is a collection of different small objects with which to play in the sand. The play can be photographed and recorded during the game and after the Sandplay is finished, when feedback is discussed and recorded.

At various events, a range of objects including historic objects, herbs and spices and old fashioned sweets, seashells, stones, feathers, marbles and scented flowers were assembled. There was a soundtrack of music or a blackbird singing.

Sandplay in this context is a shared activity that integrates play and choice with small hand sized objects. It involves an unplanned dialogue with individual's inner thoughts and memories. It's fun, joyful and relaxed. Sandplay mirrors the eternal child in us all.

At a sandplay session with patients in a long term dementia ward, the staff feedback was, "we've never seen them so animated in years".

Evaluation

- An enjoyable, relaxing occasion
- The output in the sandtray was abstract but could be interpreted as a 'garden'
- The 'displacement' provided by the sandplay enabled a free open discussion, bringing out the issues without confronting difficult topics
- Experiences and stories unfolded
- It works by stimulating all the senses
- As a design tool, the approach was expressive, free form and three dimensional. It enabled exploration of space, form and materials
- As a therapy, the techniques are well established, although as a one to one therapy. The potential of participatory group sessions could be explored further.

Sand Play in Progress

Completed Sand Play

CASE STUDY 2 - "DESIGN FOR DEMENTIA" DWELLING

This is a demonstration project arising from the "Design for Dementia" guide. The aspirational concept is to take the simplest of dwelling types and to design an "ideal" model bungalow.

Methods

- Use the design principles established by the "Design for Dementia" guide and other advisory guidance.
- Design a paradigm for a dementia friendly dwelling
- Incorporate statutory standards and voluntary codes for design
- Participatory design process involving hands-on modelling to explore the design with the SURF group (Service Users Reference Groups)
- Evolutionary design process to demonstrate adaptability.

Principle Design Features

- Simple layout, easily navigable
- Visual cues to assist orientation
- Visual connection and easy access between living room, bedroom and wc
- Hoist route from bedroom to bathroom
- Option between shower or bath
- Separate wc / utility area
- Natural light into the middle of the plan
- Garden with patio area and raised planting beds for easy gardening
- Bedroom for carer - potential moveable wall
- Interior finishes appropriate for dementia
- Open plan kitchen/dining/living area with easy access to the garden
- Easy access between garden and wc
- Energy efficient low carbon design and specification
- Level access throughout
- Spaces large enough to provide good ease of movement
- Natural ventilation
- Clearly visible front entrance
- Easy natural flow between rooms
- Higher levels of artificial light (twice normal)
- Task focused lighting
- Reduce the number of doors
- Good views from seated position to front and rear to green
- Tonal contrast between floors, walls and doors
- Views of the approach to the front entrance
- Viewable kitchen/bedroom/bathroom storage - easy to find things
- Easy to maintain.

Evaluation

- The design demonstrates key principles which should be incorporated into new developments to assist "ageing in place".
- "Design for Dementia" can help people living with dementia to retain their independence and sustain their capacity for longer.
- In fact, all disabilities, physical and cognitive must be considered through the design process.
- Space is a key requirement to enable specialist design features to be incorporated and to facilitate future flexibility.

Fig 1. Participatory Design Session Involving 'SURF Group Members

Fig 2.The "Design for Dementia" Dwelling

CASE STUDY 3 – "GREENPRINT" AND HOSPITAL COURTYARDS, UNIVERSITY HOSPITAL, SOUTH MANCHESTER

HLP produced a "Greenprint" for the hospital which is the "greenest" hospital in the country. The Greenprint proposes an environmental strategy aimed at creating a therapeutic environment for the hospital enhancing the health and wellbeing of both patients and staff.

At the Starlight Unit, HLP were challenged to transform an existing bleak and landlocked concrete space into an easily accessible, protected and uplifting outdoor courtyard for use by child patients, their carers and staff at the paediatric outpatients clinic at the UHSM.

Works included colourful paving and sensory planting in a maritime theme with a colourful blue "pool", gravel beach and chunky timber uprights; dry coastal style plants and grasses rustle in the breeze and provide interest for touch and smell.

Fig 3. Courtyard Providing Space for Relaxation and Contemplation

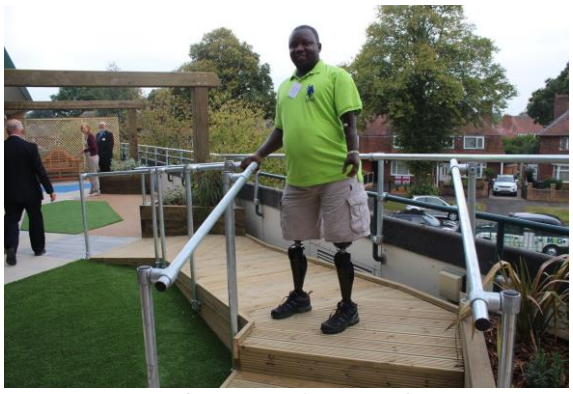

Fig 4. Rooftop Garden

Evaluation

- A series of inward looking courtyards were designed to enhance the healing of patients, providing space for relaxation and contemplation.
- The Starlight Unit in particular provides scope for activity and play for children in hospital, aiding their recovery.
- The rooftop garden was purposely designed to aid the recovery of amputees. The design incorporated different surfaces, steps, ramps and handrails to assist patients to relearn mobility skills with prosthetic limbs.

Before *After*

Fig 5.The Starlight Unit Play Area Attached to the Children's Ward

MEDIUM SCALE

CASE STUDY 4 - WEST EVERTON AND BRECKFIELD SURESTART AND FAMILY CENTRE, LIVERPOOL

The Sure Start project comprises a holistic and therapeutic mix of children's and family facilities located in an inner city neighbourhood. The architecture is attractive, welcoming and inclusive. Light, scale, textures and coloured materials provide stimulus. A cafe and swimming pool is provided, facilities that provide training, therapy, children's play, baby massage, relaxation and water therapy. The exterior play spaces and landscape are an integral part of the design and are based on the same therapeutic philosophy and design principles.

HLP worked closely with the Local Authority and the staff to develop the philosophy into a design which fully expressed the spirit and the principles of Sure Start in a working project.

The building is attractive, welcoming and inclusive, and uses light, scale and the texture and colour of materials to provide stimulus to young children through every aspect of the building. The spaces are well organised and visually linked to enhance safety, security and control.

In addition to the café and swimming pool, facilities are provided for training, therapy, children's play, baby massage, relaxation and water therapy.

Evaluation

- A child centred approach to design was at the heart of the design philosophy.
- Participation was at the core of the design approach
- The design creates a stimulus to young children in every aspect as well as providing support for parents and families
- The benefits of a Sure Start will improve educational capacity through life.

Fig 6. Pool

Fig 7. Reception Area

CASE STUDY 5 - NEW EARSWICK FOR ALL, YORK

This project forms a landscaped core for New Earswick, a historic early "garden city" and provides the setting for new Extra Care facilities.

HLP's challenge was to design a high quality public realm for the new care home, providing an accessible open space with play facility that would be a valuable community resource and encourage community cohesion; place-making was central to the design philosophy.

A key principle to the design was to create a dementia and disability friendly public realm for enjoyment by all sections of the New Earswick community.

An intensive stakeholder and community engagement process, ran in parallel and feedback informed the design development.

Design was informed by a design guide aimed at strengthening the character and role of the site and establishing design principles. The guide illustrated the design development in terms of spatial form, enclosure and character. It established quality standards and a supporting rationale that will inform the long term maintenance plan.

The guide integrated palettes of hard materials, street furniture and tree/shrub species and specifications to be used to achieve environmental quality standards and ensure cost effectiveness.

The final design for New Earswick is a fully integrated landscape setting responding to the community's needs and aspirations while also creating an environment designed to "Design for Dementia" principles, enabling residents safe and secure accessibility.

Evaluation

- Engagement with the client, housing managers, the wider community and conservation officers has produced a rich responsive and evolved design.
- The focus on the needs of dementia patients alongside the aspirations of the community was a challenging design brief, successfully resolved.
- The landscape scheme will be "therapeutic" for both Extra Care residents living with dementia and the community as a whole.

Fig 8. Landscape Providing a Rich Sensory Experience

MACRO SCALE

CASE STUDY 6 - TERRACED HOUSE CONVERSIONS AND NEIGHBOURHOOD REVITALISATION

The Anfield Village and Rockfield Road neighbourhoods had become severely run down including a significant number of properties becoming boarded up or semi-derelict. The external environment is also poor. The housing neighbourhood was completely lacking in open space or green environment. There are problems with car parking, refuse collection and the impact of LFC match day pedestrian movements.

HLP developed an environmental masterplan for "Anfield Village" which would underpin the housing regeneration and to create a new system for centralised recycling, tree-lined avenues, landmark gateways and a centrepiece new square. Derelict sites will be used to create space for the recycling areas and wider pavements, which will become the tree lined avenues. The new urban park will connect to the tree lived avenues and give much needed breathing space to the terraced streets.

Two into One Conversion, Anfield, Liverpool

Diversification of housing offer and choice of different types of accommodation attracted people back to the area and began a process of rebuilding the community. HLP put forward an innovative proposal to bring back to life an area of failing "two up, two down" Victorian terraces.

The pilot project developed the concept of "two into one". The design tackles the challenge of small substandard dwellings with steep staircases, no private amenity space, and poor kitchens and bathrooms, by demolishing the seventies "outriggers" and combining two properties to create a ninety meter square, three bedroom family house with a private garden.

Modern kitchens, bathrooms and staircase, produce an attractive housing option at a viable cost. Low energy specifications include good thermal insulation to the walls and roof space, and a positive pressure air input ventilation system.

Evaluation

- Greening neighbourhoods of Victorian terraced housing including the introduction of private gardens has transformed the image and attracted people back to the run-down neighbourhood.
- The revitalised neighbourhood has a more settled and established feel. The importance of a "green view", has been demonstrated by Edinburgh University to have a significant effect in reducing stress.

- Historic neighbourhoods need to "compete" by playing to their strengths eg historic character and association, but also to overcome their weaknesses eg lack of amenity space, fuel poverty, poorly maintained public realm, inadequate recycling, rubbish filled back alleys and poor image.
- Diversification of tenure and housing choice improves the offer by providing various sized houses at a size appropriate to modern needs and aspiration.

Fig 9. Two into One Gurnall Street

Fig 10. 'Greening' Anfield Village

CASE STUDY 7 - ELDONIAN VILLAGE

The Eldonian Village is an internationally recognised model of successful, community-based urban regeneration. In 1982 the practice began working with the Eldonian community, which was at that time living in a blighted inner-city environment characterised by high levels of unemployment and deprivation. The approach was holistic from the outset, developing the concept of a "self-regenerating community", through a philosophy rooted in community empowerment. Community facilities include a village hall, sports complex and community offices.

The practice pioneered innovative approaches to design participation, involving all members of the community, and designed the village through a process which developed a very strong sense of community ownership. The design creates a highly successful, convivial housing environment, conducive to community life with inherent safety and security. The success of the scheme has been the catalyst for wider neighbourhood revitalisation and has influenced ideas and policy agendas on regeneration, nationally and internationally. Although designed some time ago, the project demonstrates the principles of community sustainability through success in action.

Evaluation

- The scheme was independently, retrospectively evaluated using a model for sustainable communities as part of the publication, "Regenerating Liverpool The Eldonian Way", by Jack McBane.
- The design process was participatory with each future residents needs being explored and considered. The needs of disabled members of the community were incorporated into the design. This resulted in all dwellings being designed to enable wheelchair access for all.
- The benefits of this integration of disabled people in the community has particularly helped wheelchair users to feel full members of the community and in some cases has assisted recovery.

Fig 11. Future Residents Participate in the Design for their Homes

Fig 12. Phase Two of the Eldonian Village Overlooking the Leeds / Liverpool Canal

CONCLUSION

In this paper we have set out to question if the environment can have a therapeutic effect on human wellbeing? We investigate this question from the perspective of architecture, landscape, urban and interior design. We explore the question at different scales, as architects, academics, landscape architects and urban designers; in addition, case studies include a large amount of public engagement and participation projects.

We come to all the projects as "experts in experience". Our case studies are presented clearly as evidence. Our “working practice” covers a forty year period, as academics and practitioners. This paper actually started with a question and a conversation. We hope our answer is yes, the environment can have a positive effect on physical and mental wellbeing. We are convinced of the value of the "view to green", of trees, plants, shrubs gardens and landscape. We are equally convinced of the value of design collaboration, co-design and cooperation with residents and users.

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SUSTAINABLE LIVING FOR AFFORDABLE HOUSING DEVELOPMENTS: RESIDENTS' PERSPECTIVES

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1. INTRODUCTION

According to an article in the Post-Standard in 2016, more than 3,000 people were on the waitlist for the 3,500 public housing units available in the city of Syracuse at that time[1]. Apparently, this amounted to a three-year wait before being placed in a housing unit. Hence, there are a very limited number of spaces in the small number of affordable housing units within the city. A study by the Syracuse Department of Neighborhood and Business Development on 2017, stated that only 10.3% of housing units in the city of Syracuse were subsidized to make them affordable[2]. The housing situation has not gotten any better today. Research found that out of 144,564 people with annual income qualified for affordable housing, only 61.43% were placed into affordable housing in Syracuse[3]. Not only is this a concern for the city's unstable housing situation, it also leaves a significant gap in housing access for the cost-burdened residents of Syracuse. Families faced with a severe rent burden are left with few available resources for necessities like food, healthcare, clothing, education, etc. Thus, the lack of quality, safe, affordable housing coupled with concentrated poverty affects the daily health, safety, and opportunity structure of Syracuse residents[4]. This is an even greater problem for low-income and refugee families with limited and temporary federal assistance.

The lack of affordable housing is a concern in many areas of the US, as is the quality of housing provided (such as if it adequately provides a physically safe space for people affected by this housing crisis). State and local governments are responding by providing more funding for affordable housing, in addition to making new structures green and energy efficient. In 2012, the USGBC argued that all new buildings should be green in order to expand access to the benefits of healthy, efficient, and affordable housing. Accordingly, several building environment assessments and rating systems have been developed and applied to promote sustainable development in the US, as well as help guide the creation of sustainable affordable housing communities.

Cowen[5] argued that sustainable and affordable housing are misunderstood and believed to be incompatible. However, considering both the short and long-term financial benefits, sustainable interventions are necessary in affordable housing. There is also the perception by most in the building industry that sustainable design costs considerably more than its conventional counterpart, but this has been proven to be a misperception. With the growing trends in sustainable design and technology, the green markup is continuously shrinking, and sustainable construction is becoming more affordable among industry partners[6]. Over the last several decades, sustainability has drawn much attention, and is now a common news topic. Sustainable living offers a healthier environment and more efficient, durable buildings that have less environmental impact and a lower cost of operation. Thus, paring sustainable development with affordable housing seems to be a natural and effective response to future housing needs.

The residents of sustainable affordable housing experience a range of financial, social, health, and ethical benefits. Quality sustainable designs allow for ease of use, comfort, and pleasure[7]. To better understand these benefits, it is critical to study the perceptions of residents regarding the outcomes of their daily use of sustainable design interventions. This research will be useful to housing developers, architects, interior designers, industrial engineers, and design educators seeking to understand and evaluate the impacts of various sustainable interventions in residential projects. Based on residents' evaluations, this study also provides information for developers seeking to understand the effectiveness of financial investment as well as social and behavioral values in this type of project.

2. STUDY DESIGN AND SETTING

This research addresses certain gaps in the literature by conducting a case study of various housing communities developed by HousingVisions in Syracuse, New York. It focuses on residents' perceptions of their daily uses and experiences with applied sustainable interventions. HousingVisions is a not-for-profit 501(c)(3) agency that develops affordable housing and communities in various locations in New York[8]. This research explores residents' actual perceptions of the positive financial benefits of this type of living, as well as the ease and comfort they find in their use of sustainable interventions. Specifically, this research considers whether these residents perceived significant financial benefits in their utility bills after moving to sustainable affordable housing communities, as well as whether they preferred using sustainable interventions.

2.1 Study Location

HousingVisions is a leading sustainable affordable housing revitalization company that uses a series of innovative sustainable design guidelines such as the US Green Building Council's LEED rating system[9], Enterprise Community Partners' Green Communities Initiative[10], and Energy Star Program[11]. The four participating communities in this study are distributed throughout the state of New York (see Figure 1).

Van Keuren Square, located in Syracuse, includes 50 apartment units for homeless veterans. It holds the first LEED Platinum certification awarded in the Syracuse area, and includes many activity-friendly design features such as community gathering areas, a computer lab, laundry facilities, a gym, outdoor patios, and a community garden. Targeting low-income families, Mass Ave Community Homes, located in Buffalo, is an Energy Star-certified community consisting of 16 multi-family structures holding a total of 46 units. Genesee Crossing in Utica provides low-income seniors with 33 units in 13 multi-family structures. Genesee Crossing is also Energy Star certified. Lastly, the SE Payne Cornerstone in Auburn provides 36 Energy Star-certified apartments to low and very low-income families.

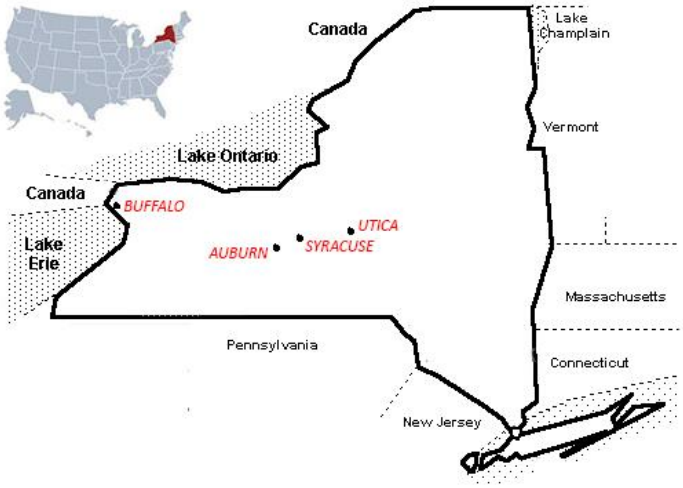

Figure 1. Location Map

2.2 Methods

This study used a mixed method that combined informal interviews with property managers and a survey of residents (n=33), in order to triangulate the results. The interviews were conducted first to obtain information about the properties and residents in HousingVisions communities; the data collected were used in the next phase, to design and develop the survey instrument. HousingVisions recruited managers from the four (4) most-recently completed sustainable affordable housing communities (see Figure 1). A series of questions were asked and topics addressed via content analysis. The survey of the residents of these four (4) communities was designed to provide demographic information, as well as inquire as to how residents perceived the sustainable practices and interventions provided in their homes and determine if they were influenced by them. The sustainable practices and interventions mentioned in the survey were utilized by residents on a daily basis, as were built-in equipment and furnishings in the interiors of their homes. There were ten (10) questions in total, and completing the survey took approximately 10 to 15 minutes.

The participants were recruited through hard copy invitations sent directly to residents (distributed by property managers through onsite mailboxes). Due to residents' limited communication channels, no reminders were sent out. The surveys were collected four (4) weeks after the initial invitation. After the survey results were collected, they were analyzed for descriptive statistics.

3. STUDY RESULTS

In the fall of 2016, interview meetings were held with the HousingVision's (2) two construction and sustainability division and four (4) property managers. The interviews revealed that projects completed within the last five to seven years by Housing Visions were all passive housing that respected the ecological aspects of the structures[12]. At a minimum, they were all Energy Star certified, except for Van Keuren Square, which was LEED Platinum certified. Because the developer owned all of these properties, the apartments and homes were only for rent. Since the properties were developed using guidelines that considered their lifespan to improve energy and water use efficiency, the company saved a significant amount of money on their operation, maintenance, and utilities. All of the properties were Energy Star certified or better, and the management tried to provide high-quality fixtures. When possible, they provided fixtures that exceeded the minimum required qualification

standards (see Table 1). Current and future structures would be equipped with high-efficiency tankless water heaters in each unit, which provided more square footage for residents to occupy.

Table 1. Specifications of the Plumbing Fixtures Provided[13]

	Maximum Gallons per Minute (gpm) per ASTM	Maximum Gallons per Minute (gpm) per HousingVisions
Bathroom	2.2	1.5
Kitchen Sink	2.2	1.5
Shower Head	2.5	1.75
Toilet	1.6 (gallons per flush)	1.28 (gallons per flush)

In addition, these houses were equipped with energy efficient appliances and lighting fixtures. For most units, the utility bills were included in the rent. Water, electric, gas, and garbage cost approximately $80 to $85 per month, on average, for a typical Energy Star-certified two-bedroom apartment (approximately 915 sq. ft.), and $65 to $70 per month on average for a LEED Platinum-certified apartment of similar size. Given that the utility fees in the city of Syracuse normally range from $80 to $200 per month, the utility bills in these apartments were at the very low end of the spectrum. HousingVisions also managed apartments that were not retrofitted to be energy efficient. The company was planning to convert all of these non-energy efficient buildings in phases within the next five years. When comparing the utility fees between the non-energy efficient units and the Energy Star-certified units, the Energy Star units saved the company approximately 20% in overall utility bills.

3.1 Survey Results

The interview results mentioned above were based to generate survey questions to understand the residents' perspectives on sustainable housing. A total of (33) valid responses to the survey were collected, yielding a response rate of 20%. The residents' income and background information were researched in the early phase; to be eligible to reside in HousingVision homes, a household must be categorized as low or very low income, or include a homeless veteran. The conditions and quality of respondents' previous homes were presumably very low, beyond what they currently occupied.

First, the survey asked the residents' perspectives on water use and flow from kitchen and bathroom (sinks and showers) as follows (see Figure 2). Compared to the level of usage in their previous non-energy saving homes, 42.4% reported that they perceived as using less water at their current residences, and 36.6% indicated that they notice no difference in their usage from either. In the following questions of 'why', among the 42.4% of respondents, 18.2% stated that they knew they were using less water because their water flow was slower than before. However, in the contrast, 27.3% indicated that their water flow was faster than before. Most importantly, 57% stated that they believed they were using less water, because they were told that the fixtures provided in their residences used less water than conventional fixtures. An analysis of both questions indicated that those who responded that they used less water tended to believe this was the case because they were informed by the management about the energy efficient fixtures and the savings they'd provide. Regardless of the level of actual water usage, most residents did not recognize the difference between water-reducing fixtures and conventional fittings.

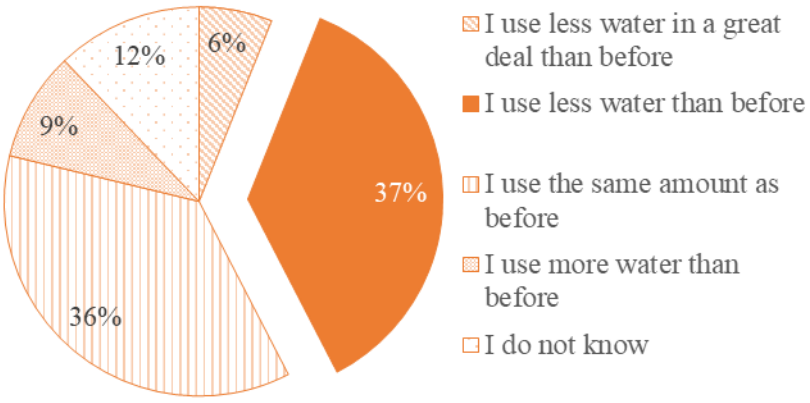

Figure 2. Water usage at kitchen and bath in comparison to the previous home

Additionally, most residents responded that they do not experience any new discomfort from using these fixtures. A total of 60.6% reported that they were satisfied, and their use of water reduction fixtures was desirable because it reduced their overall water usage. Only 30.3% stated that they did not observe any changes in the impact of their current fixtures. A small percentage (6%) indicated that it was an overall negative experience, because the water flow was too slow (see Figure 3).

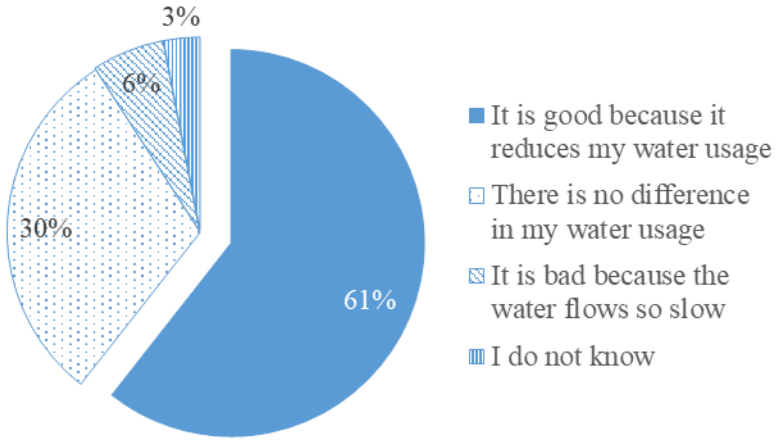

Figure 3. Overall perception of water saving plumbing fixtures

Residents' perspectives on energy efficient tankless water heaters versus conventional hot water heaters were as follows. The survey reminded participants that their current homes were equipped with tankless instant water heaters that were supposed to supply two to three gallons of hot water instantly, on demand, and not take up any floor space. The survey also informed them that conventional hot water tanks usually hold 40 to 50 gallons of hot water, but require storage space. Based on the residents' experiences and use, 60.6% reported that they preferred tankless water heaters, while 15% preferred conventional hot water tanks. A total of 24.2% indicated that they had no preference. Their preference for the tankless water heaters stemmed from the extra square footage to the units they allowed. Those participants preferring conventional hot water heaters attributed this partiality to a high use of hot water; thus, they preferred the abundance provided by the conventional hot water tank.
Residents' perspectives on utility bills were affected by the fact that only nine of the 33 respondents actually paid their utility bills on their own, while the other apartments included utility fees in their

rent. Of those nine, 42.3% responded that they paid noticeably less in utility bills each month, which impacted their overall finances. Another 18.1% indicated that their bills were the same as before. Both management and residents reported financial benefits from the reduction in water use without any significant discomfort or other negative impacts.

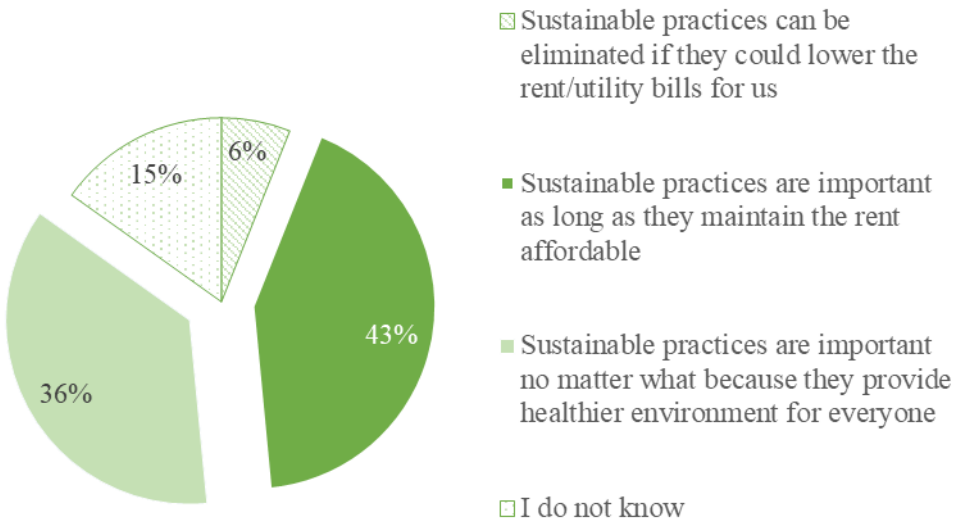

Figure 4. Overall perception of water saving plumbing fixtures

The final question examined residents' overall perspectives on the sustainability practices and interventions provided in their affordable housing. With the current economic crisis and high level of unemployment, the need for high-quality affordable housing is greater than ever. Today, affordable housing is not limited to merely providing a decent living space for people facing financial difficulties. Many organizations have begun providing affordable housing that is both sustainable and energy efficient, which helps keep long-term operating costs low. While 36% reported that sustainable practices are always important because they provide a healthier environment for everyone, 42% indicated that the concept of sustainability should be promoted under one condition: that rent remains affordable. Another 6% specified that sustainable practices and interventions should be eliminated if they do not bring financial benefits in terms of both rent and utility fees (see Figure 4).

This study has several limitations. A one-time survey distribution to residents' mailboxes was the only means of recruitment. Property managers advised that reaching residents was typically very difficult, and normally had to be done via US post or telephone. Since many low-income families and formerly homeless veterans do not own computers, no electronic means of reminder could be sent out. Therefore, the sample size was relatively small and subject to non-response bias. Second, most of the residents were either homeless or living in very poor conditions prior to residing at the properties in question. Thus, their pre-move data were subject to possible recall errors. Despite these limitations, this study advances important knowledge about actual residents' perspectives on sustainable practices and interventions in their daily lives. This is an important yet understudied area, with significant implications for decision making with regards to sustainable affordable housing developments. The results of this study provide solid evidence that while most residents in such developments do use less water and energy, they do not necessarily experience any discomfort or inconvenience as a result.

4. FUTURE STUDY

These findings are preliminary results that can be used to guide the next steps of this study. This research was limited to examining a small part of the sustainability practices people use on a daily basis. While the sustainable interventions brought financial and maintenance benefits to the developers and property managers in both long and short terms, these interventions did not significantly impact the lives of the low income residents in day to day basis. However, what the researcher has discovered at the collection of the survey was the educational value of living in these housing units. Without sensing any differences between conventional and energy saving fixtures, these residents were appreciative of taking a part in energy saving pursuits as well as promoting healthy environment. A few respondents have commented on how much living in sustainable housing had changed their lifestyles and the ways they educate their children about the use of resources. For instance, one mother of two children noticed that since their move, her children recycled household garbage on their own and made comments to people who did not recycle. She reported that the quality of their lives significantly improved after relocating to the sustainable housing development, thus the sustainable living has lead to healthy lifestyle for her family. The next step is to develop a full structural model to investigate how these environmental changes influence their lifestyles and inform them of the important environmental and social benefits.

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THE TRANSFORMRATION OF URBAN VILLAGES IN THE CITY OF HANOI

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INTRODUCTION

In the literature, the meaning of urban villages is sophisticated. Many studies in the Western countries consider urban villages as the planning ideology that creates new urban areas having all characteristics of villages [1]. The principles of urban villages include a strong sense of place, a pedestrian and friendly environment, and a high degree of involvement of community in design and management processes. Thus, the Western notions of urban villages have been widely perceived as planned areas that promote social interaction and balanced community. By contrast, in various countries in Asia, a definition of urban villages refers to rural settlements that become parts of the urban structure under the rapid urbanisation. Therefore, the term urban village can also be understood as "*villages in the city*" to describe the urban transitional phenomenon[2].

Hanoi, the capital city of Vietnam for nearly 1000 years, located in the South of the Red River. The development of the city started when Ly King chose this area for the royal citadel. Since then, the city has developed continuously and become the political, economic, social and cultural centre in Vietnam[3]. However, the development of current urban structure of Hanoi could not be separated from the development of the traditional villages. Within the urbanisation process, traditional villages have been transformed into parts of urban metropolis. The original villages that were identified by farms and natural landscape have been surrounding by modern buildings and infrastructure. Thus, the urban villages represent a special feature of urban pattern due to its embedded historical, physical, economic and social factors.

The urban village phenomenon has aroused multi-disciplinary studies in academia. The involving disciplines range from sociology, history, psychology to economy. According to those studies, the urban villages were not built or constructed by developers. In many situations, villagers lost their farmland because of land requisition by the government for new urban projects[4]; therefore, farmers developed their houses for rent and small business to generate income[5]. Moreover, the migrants spread to cities to seek jobs and to buy the house to become the urban residents. As the local government lacked of detailed planning and weak controlling, villagers and migrants always build their house as big and high as possible with poor application of regulations[6]. On the other hand, urban villages have some advantages such as pedestrian accessibility, self-containment, mix-land use and neighbourhood interaction. Urban villages are the idealist place for migrants who are seeking shelters in cities[7]. In addition, during the process of urbanisation, urban village is an important area for villagers to adapt to new conditions in urban areas[8].

Despite of a high volume of studies in urban village, there is a scarcity of research on the transformation of urban village and its adoption within Vietnamese urban context. Perhaps due to the limitations of data availability, the study of urban villages in Vietnam is quite scares. Several important questions remain unanswered, such as how did urban villages emerge and develop in the process of city development? How did urban village influence living quality? And how to improve living standard in urban villages? The answers to these questions matter because these provide us knowledge regarding relations between city development and the creation of urban village. In addition, at planning level, it becomes possible to recognise and analyse the urban village's patterns with respect to overall structure of city development. Finally, it will be possible to gain clues that how to deal with these urban villages in general and with specific one.

To answer those research questions, this article explored the development of urban villages in rapidly growing city of Hanoi. Data were collected during several fieldwork periods in 2015, 2016 and 2017. During the fieldwork, two urban villages were visited to observe interesting features of their development. Therefore, this paper shall introduce the urban villages in Vietnam though the lens of socio-cultural factors and historical development of Hanoi.

FORM TRADITIONAL VILLAGE TO URBAN VILLAGE

Village is the basic social and self-sufficient unit in Vietnam for centuries[9]. Originally, each village was built surrounding dominated clan or particular surname lineage. In addition, each village has its own rules and customs. The Vietnamese proverb "*The customs of the village have precedence over the laws of the king*" (In Vietnamese: "*Phép vua thua lệ làng*"), shows that a village was considered as independent area without the control of state or political regularities. Another proverb "*each village strikes its own drum and worships its own deities*" (In Vietnamese: "*trống làng nào làng ấy đánh, thánh làng nào làng ấy thờ*"), emphases that the Vietnamese village was a unique complex system that only support its community. Villagers had litter connection with other people outside their community.

In term of physical pattern, village's settlement was formed depending on surrounding natural landscape and agricultural and fishing activities[10]. Villages normally situated in the high ground areas that helped to protect villages from flooding and external aggressions. One village could have several clusters. All clusters located around the communal houses, temples, pagodas and wells while the village gates situated outside near the main road. Furthermore, the traditional village was surrounding by a row of bamboo trees for protection. The villager's houses were generally connected with each other though the fish bone system or particular pathway made by house owners based on their agreements.

In terms of belief systems, there is a combination of several religious practices including Buddhism, Taoism and indigenous folk religions. The religion practices are necessary activities for each villager. In festival days, villagers always go to their temples, pagodas and communal house for worship. Every year, villagers have to donate money or time for self-help activities to maintain those public buildings.

The city slowly expanded during the central economic planning period (1954-1986). During this time, Vietnamese government applied the central economic plan. The planning focused on collective quarters and industrial zones around the outskirt of city. In addition, during this period, the state applied Ho Khau system to control migration from rural to urban areas[11]. Movement

from rural to urban areas had to be approved by the authority. Because of strictly controlling, the rate of urbanisation was very low, except several rural villages were merged into new urban structure. Village's structure was basically remained unchanged.

In the late 1980s, Vietnam implemented the economic changes from central command economy to socialist oriented market[12]. Within the political and economic transition, Hanoi has become a dream place for migrants. The Ho Khau system, which has been using to control the rural to urban migration, has lost its function[13]. Rural migrants could register as temporary residents in urban areas. In addition, foreign investment and private enterprises increased significantly; new jobs that do not require Ho Khau in industrial and services sectors emerged. Consequently, the reforms turned a new page of rapid rural-urban transition. In 1954, the urban population accounted for only 12% of the total population[14]. After three decades of central economic planning which restricted urbanisation, the proportion of the population living in cities reached 20% in 1985. On the contrary, after thirty years since the reforms, nearly 34% of the total population were living in urban area, and that number is predicted to reach 55% by 2050. Typically, in Hanoi, rural-urban migrants contributed approximately 40% of the urban population[15].

The process of rapid urbanisation and changes of urban landscape have affected every aspect of rural villages. Vietnamese cities not only have fast rate of urban population growth, but also facilitated urbanisation by absorbing massive number of rural villages. For example, the urban land increased from 2,200 square kilometres in 2000 to 2,900 square kilometres in 2010[16]. To accommodate investment and development, the government relies on urban development to convert sub-urban rural for urban use[17]. In this process, the government tends to requisition farmland rather than settlements of rural villages to avoid costly and time-consuming programmer requiring the compensation and relocation of villagers. As a result, the settlement components of villages remain while their surrounding environment dramatically changes. New urban areas spatially surrounded villages leading to the formation of urban villages.

Figure 1: The formation of Me Tri urban village in Hanoi under the process of urbanisation (Based on satellite images).

For example, the urban block in the south of Dong Da district (figure 2) is a combination of several parts of traditional villages namely Xa Dan, My Duc, Trung Tu and Trung Phung. In the past, there were several small lakes and rice fields that separated villages. Over the process of development, urban projects have filled the lakes and rice fields. Except surrounding roads were improved and built around the villages. The circulations inside the urban villages are still based on traditional alley system. Most alleys are too narrow to be used by cars and public transports.

Figure 2: Street structure in one urban block in Dong Da district (Drawing by Ngo Kien Thinh)

Due to low income, most migrants came to Hanoi living in the urban villages to avoid expensive living costs. For the villagers, they soon realized the benefits of upgrading their own houses for rent. The migrants are great tenants because they do not complain much about the living conditions of the urban villages. Therefore, villagers always redevelop their houses as big and high as possible result in the transformation of dwellings in urban villages. When the migrants earn higher income, they would buy houses in the city. However, property prices in new housing projects are very expensive based on market price. On the other hand, villagers who lost their agricultural land due to land requisition need saving to support their urban life. Thus, villagers in pre-urban areas always have to sell parts of their land in villages with cheaper price than those in new urban areas. Consequently, plots in villages were divided into smaller plots for selling[18]. Today, urban villages have become chaotic areas with different social groups including traditional villagers, new residences, and rent's group such as workers and students.

Since the economic reforms in 1986, the government tried to control housing development. The land allocation standards were adjusted including limited for the height of private houses and limit areas and size of land. Those policies did not slow down housing development in urban villages. Most households in urban villages were able to rebuild their houses. New houses were constructed with modern materials such as concrete and brick. In addition, most buildings in urban villages exploited the regulations to maximize their built-up area and living spaces. Thus, building density in urban villages become very high.

Figure 3: Building density in urban village (Drawing by Ngo Kien Thinh)

The transformation process from old village to urban village significantly affects livelihood of villagers[19]. Finding a new job is a challenge for villagers. Villagers start to join the informal jobs with low-wage in the cities such as street vendor. In addition, if their houses located in main alley or streets, villagers generally set up shops on the ground floor of their own houses. There are various types of shop including grocery shops, café, small restaurants, hair salons or clothing shops. Overall, these shops provide basic products, necessities and food targeting low-income groups. Their prices are cheaper than those in well-established stores or supermarket. Shops and restaurants normally run by house owners. Most of restaurants in urban villages are big enough for eight to ten chairs and several small tables. In less busy alleys, the ground floors are generally used for workshops, stores or online shops. Most urban villages maintain at least one street market, where local residents could find fresh vegetable, meat, poultry and fish on a daily basic. When new urban areas emerge surrounding an existing urban village, those restaurants and shops

would be upgraded. As a result, more expensive shops and restaurants could be found along the main busy streets.

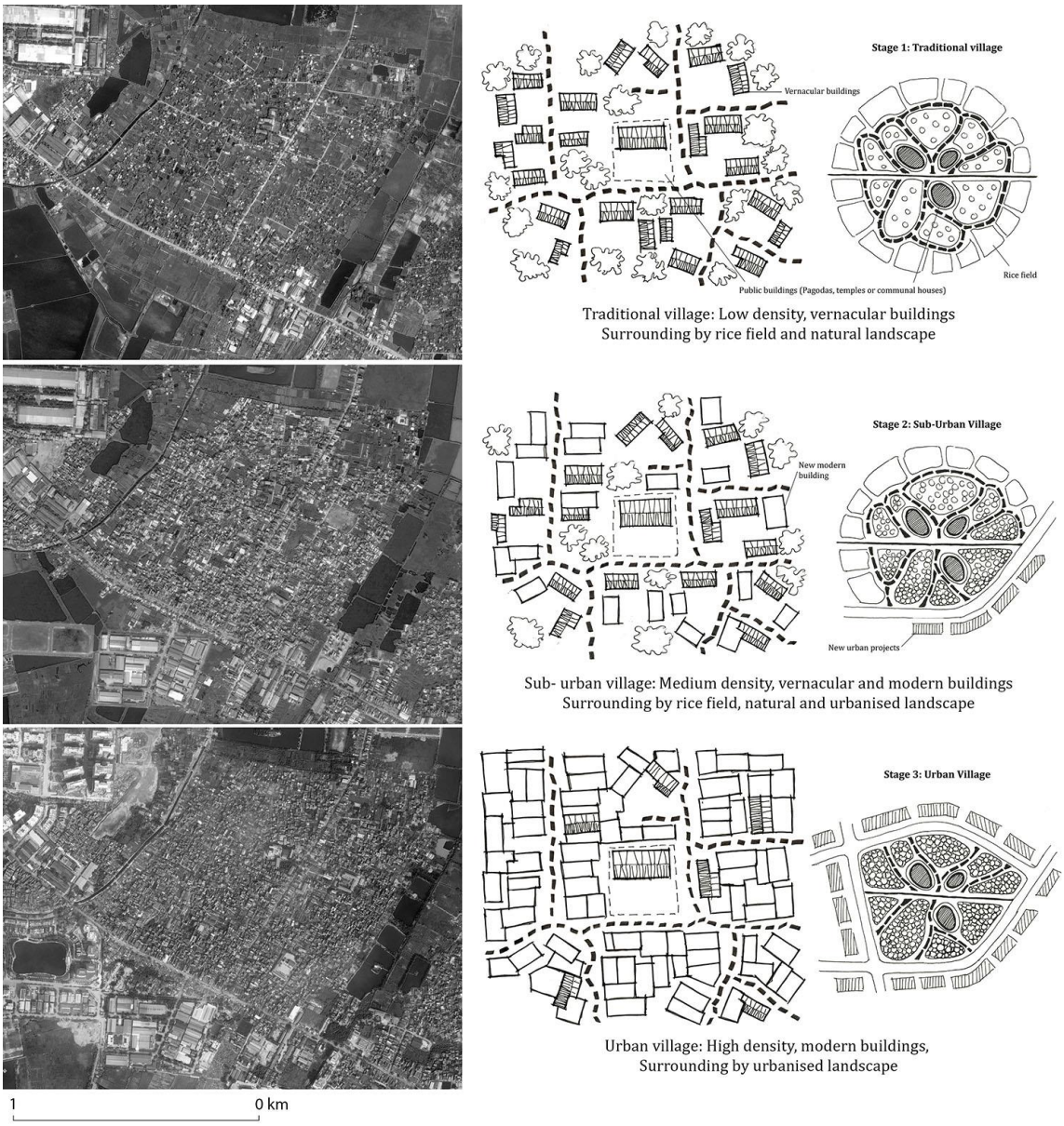

Figure 4: The transformation process of Vinh Hung village (Drawing by Ngo Kien Thinh)

In term of planning, urban village is considered as existing residential area, and there is no macro project to develop those areas. Since the urban village become a part of urban structure, the administrative community is transferred from township to ward and district levels, which provide social welfare such as schools, clinics and activities centres for the villagers. The local administrative levels also have responsibility for providing, management and upgrading infrastructure. However, due to gradually increasing land price in the urban villages, the costs of redevelopment and compensation become higher and higher. Most of projects are to develop

basic facilities and amenities such as water and sewage system, electricity, and basic social facilities. Despite that, the streets in urban villages are narrows and dark inside, the electronic wire is speared above the head; the buildings strip the skylight. The most popular public spaces in urban villages are historical communal buildings such as temples, pagodas and communal houses.

Figure 5: Alleys in urban villages in Hanoi (Image by Ngo Kien Thinh)

Figure 6: Historical buildings highlight the evidence of original villages (Images by Ngo Kien Thinh)

LESSION FROM CHINA DEVELOPMENT

China applied similar political ideologies as those in Vietnam for urban development[20]. Since the economic reform in 1978, new urban projects have been constructed by large developers. However, in early 2000s, when agriculture land became scare and might result in national food shortage, the government started to strictly control spatial extension of cities. Therefore, developers turned their focuses on residential land in urban villages. In addition, although urban villages are not considered as slum, urban villages are generally being criticized for various negative social aspects including crimes, fire hazards, public health and conflicts[21]. In order to solve environmental and social issues in urban villages, the public policies often aim at demolition and redevelopment of urban villages into large-scale modern living and service facilities. In this way, urban villages are considered to be absorbed within the formal administration system, and government can apply same urban planning policies over the new neighbourhoods[22].

Despite that, the redevelopment projects may raise a number of social issues such as gentrification and changing of villager's livelihood. It is difficult to redevelop urban village due to conflicts between three groups: landowners, developers and government[23]. Local authority aims to develop the modern neighbourhoods while developers want to maximize their profits and reduce the cost of redevelopment. On the other hand, villagers perceive their urban villages as their homes and work places that can generate income; thus, they tend to resist any large-scale development plans.

According to master plan to 2030 and vision to 2050, urban area in Hanoi city will be increased to 45.300 ha and that number is expected to 55.200 ha in 2030[24]. Thus, a large number of villages in the outskirt of city will be merged into urban structure. Therefore, a clear strategies and vision to develop urban village should be classified during initial stages of planning. Otherwise, urban villages will be turned into unhealthy living areas, and it will become much difficult for redeveloping urban villages.

CONCLUSION

Regarding social perspective, urban village is an important stage of urbanisation. Traditional villages in Hanoi area are changing from agricultural communities into urban neighbourhood under the process of city expansion. They serve as a special stage to provide space and time for rural people to adapt to new ways of life under urban conditions. Villagers have to learn new skills in order to make a living without crop production. However, due to basic skills and lack of training, most villagers can only find low wage jobs in the city. Thus, villagers tend to invest into their houses for their own business. For migration, urban villages are ideal places for living areas in the city due to the low renting and living cost. Thus, the built environment in urban villages is diversity and suitable for different social groups.

In term of planning, the self-organised constructions led to poor quality of living environment. The physical structure of urban villages is identified with narrow lanes and alleys, face to face high building that strip the sky and mixed land use. The buildings are often in short of fire preventing system, natural lighting and ventilation. The height of building ranges from two to six floors. Except for several historical buildings such as temples, pagodas and communal house, generally there is no public and green spaces. Besides, the infrastructure and facilities in urban

villages are poor. Pipelines and drainage system are poorly constructed. The alleys are often very small. Most of alleys could only be accessed by motorbike and walking. All of those factors result in an unhealthy living environment and lacking of efficient management.

The lessons to redevelop urban villages in China show the conflicts of interest of different stakeholders. Therefore, during the early stage of urbanisation, urban planning should have clear visions in different scales for urban villages' future development. In master planning, urban village should be considered as a part of urban system. The vision should have specific roles regarding function and mixed development in urban areas. For the district scale, the strategies should aim to strengthen the interrelationship between different types of urban villages and its surrounding urbanized landscapes. The strategies should involve in urban road, housing distribution, publics spaces, commercial activities and other social factors.

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SOMABILITY: EXPLORATIONS WITH DIGITAL MEDIA, MOVEMENT AND SPACE WITHIN ADULT DISABILITY SERVICES

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INTRODUCTION

This paper describes an exploratory digital interaction project developed at a day centre for adults with profound and multiple learning disabilities (PMLD). Severe cuts in funding for disability services has resulted in increased pressure on support workers to provide leisure and arts activities in addition to personal care. The introduction of new technologies, whilst offering many possibilities for augmenting creativity, also need to avoid creating unnecessary demands on carers. For this reason, our project – *Somability* - focused on bodily interaction as a celebration of the way we live, whereby every individual is valued for their unique relationship with the social and physical environment. Using camera and projection technologies to graphically draw attention to the moving body, the project targeted awareness of self and environment, which attuned to the organisation's objective of supporting service users toward an independent and fulfilled life.

Background

Article 30 of the United Nations (UN) Convention on the Rights of Persons with Disabilities[1] states that it is the right of persons with disabilities to take part in cultural life on an equal basis with others. Furthermore, they should have an opportunity to organise, develop and participate in disability-specific sporting and recreational activities. Many of these activities will be provided by day care services. Statistics show that in England alone there are estimated to be 58,000 people with a learning disability supported by day care services.

The project described in this paper has been undertaken in collaboration with a day service supporting adults with a diagnosis of profound and multiple learning disabilities. The service is located in an area where more people than the national average suffer from long-term illness, and fewer than the average percentage take physical exercise[2].

The term PMLD is used when a person has more than one disability, with the most significant being a learning disability. These people are among the most vulnerable in society, and there is strong evidence to suggest that they have poorer general health and more specific health needs - such as problems with hearing and eyesight, mental health and behavioural difficulties, epilepsy, thyroid disorders, heart disorders and dental problems - than the general population[3]. A core objective of learning disability services is to support people in leading an independent and fulfilled life.

Movement

For many people, dance and music provide recreational and social opportunities. For people with disabilities they are often employed as therapeutic interventions to promote physical and emotional well-being. Research into the effectiveness of movement and dance therapy has shown that the benefits include reduced mental health problems, improving self-esteem, confidence, body image and interpersonal skills[4]. Moreover, the most vulnerable people are encouraged to participate, bringing them together socially, creating a positive atmosphere, and improving community relationships[5]. In addition to the promotion of personal and collective creativity, physical activity is crucial to staying healthy when living with a learning disability. However, ensuring that activities are inclusive and accessible can be costly and time consuming. Movement and dance activities may require additional space, or travel to another environment – a challenge in itself for day-care services - and often need to be modified for each individual based on exercise capacity and any special health or risk issues.

Agency and movement

By taking a broader view of movement as a way of being in the world, rather than a medium for intervention or therapy, we were able to target the potential for individuals, even those with more profound disabilities and a perceived lack of movement, to become active agents within their social and physical environment[6]. Our ideas align with Shusterman's philosophy of *Somaesthetics*, which takes the view that the body is never separate from the mind[7]. Dourish also favours this position in his theories of human computer action, stating that "*you cannot separate the individual from the world in which that individual lives and acts*" [8]. From the perspective of learning disability services, we sought to explore digital movement as a means to augment the relationship between the body and the physical, social and temporal space.

Digital Movement

The widespread accessibility of camera-based digital tools for augmenting movement and choreography, performance analysis and cognition, is driving technological development to such a degree that systems are becoming commercially available which allow users to make a direct connection between their physical bodies, their creative desires and the wider world around them. A great advantage of this technology, especially for people with disabilities, is that it permits unencumbered physical engagement, as no devices are required to be worn by the user. Although camera-based motion-tracking technologies have been used in interactive performances since the 1970s, the rise in visual programming and open source languages has encouraged a new wave of artistic experimentation with body movement as source material for expressive interaction. A significant feature of these experimental works is that they focus on the spatial and temporal qualities of experience rather than on the usability of an interface or how effective the system is at enabling the user to undertake a task.

Our earlier work

The basic design principles that underpinned Somability were informed by findings from two earlier research projects, ReacTickles Magic and Somantics, which aimed to capture and augment the interests of those young on the autistic spectrum [9,10,11]. These projects favoured abstraction over representational imagery, stripping out extraneous detail, using high contrast graphical lines and colourful shapes to draw attention to the sense of pressure, position, speed, elasticity and momentum[12]. By deliberately avoiding the need for instruction, the goal was to foster autotelic[13] - self-directed – play, through the physicality and aesthetics of interaction.

In 2012, we were invited to try out this work at a touch and movement therapy centre with a day service supporting adults with PMLD. During the session we used a Kinect motion-sensing camera to capture movement, which we projected onto the walls of a large studio. Almost immediately, participants appeared to be captivated by the projected effects of their actions and were observed to intentionally extend their movements. The session inspired us to seek grant funding to collaborate with a day service. This funding supported the design and development of Somability. In the following section we briefly report on our methods of designing Somability within the service centre environment, and explain how we gathered inspiration from observing and re-enacting everyday social interactions within the day service.

DESIGNING SOMABILITY

When addressing the lived experience of people with profound disability, tools and techniques are required that value people with disabilities as part of a supportive community, empowering them to participate through appropriate social interaction with peers, carers, and other familiar members of their community, as well as the design team[14 15]. An example of this can be found in the design of an assisted living device for a person with Autism Spectrum Disorder (ASD)[16]. The research employed a participatory design method that focused on learning-by doing and factored in everyday habits and routines, which led to the discovery of important cues for action without the need to cognitively process information. We approached the design of Somability in a similar manner, however, due to the complexities of PMLD, we focused on understanding the day-to-day patterns and interactions between staff and service users at the centre, rather than on the routines of individual service users.

Ideation Workshop

The first stage of design took the form of a workshop hosted in the communal dining room at the day centre. We were keen to situate the design activities in a familiar space, and to try to ensure that participants could feel relaxed, particularly as our workshop included unconventional activities that were outside of the working practice of participants. Importantly, environmental factors such as proximity, depth, light and speed can all impact on the quality of interaction, making it crucial to situate design within actual user settings.

Sixteen people participated in the event, including the centre manager, support workers and a dance therapist. Initially, there was some resistance to participation, there was a perception that they did not have the appropriate skillset to contribute. In order to address this, we proposed a combination of role-play and paper prototyping, and set a series of challenges that required re-enactments of daily routines, allowing for approximations of service user experience without any reference to technology. With consent from all participants each session was video-recorded and subsequently reviewed by the participants and the design team. The details of the workshop are beyond the scope of this paper, therefore the next section focuses on the ideas that emerged, and how they informed the various iterations of the Somability software.

Somability prototypes

Using the video footage from the workshop as inspiration, we produced a series of four-frame storyboards in which we used line drawings to abstract the movement from the situations that were being acted out. Ideas were presented to the the service team, and following several iterations of the storyboards we produced three initial digital prototypes, *Reach*, *Balance*, and *Flow*, and proposed using the Kinect camera for its capacity to capture full body movement. The device was compatible with

Windows laptops already in use at the centre, making it easy to install and test prototypes with a portable projector.

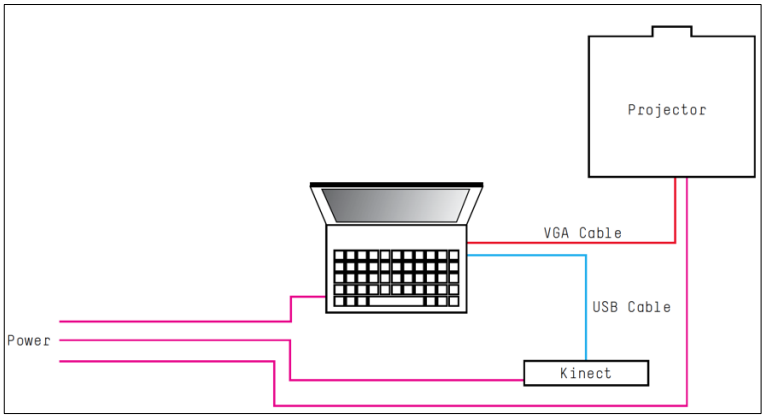

Figure 1. Camera set up

These first prototypes had two visual modes, (i) *Mirror* projected a mirror image of the user in their environment along with the graphical imagery, and (ii) *Skeleton* placed a linear stick-figure over the body in addition to the mirror image.

The intention behind *Reach* was to challenge the user to extend their upper limbs in order to reach a row of four coloured shapes - a square, triangle, hexagon and circle - as they appeared to be in the room (Figure 2). When the user reaches to hover over a shape, multiple miniature versions of the shape are released, which rain down and gather along the horizontal edge of the screen, making a floor of mini reactive shapes. Using lower limbs to disturb the floor can trigger more movement. In later iterations of this concept we set preferences for the size and location of the upper row of shapes to enable wheelchair users to more easily interact.

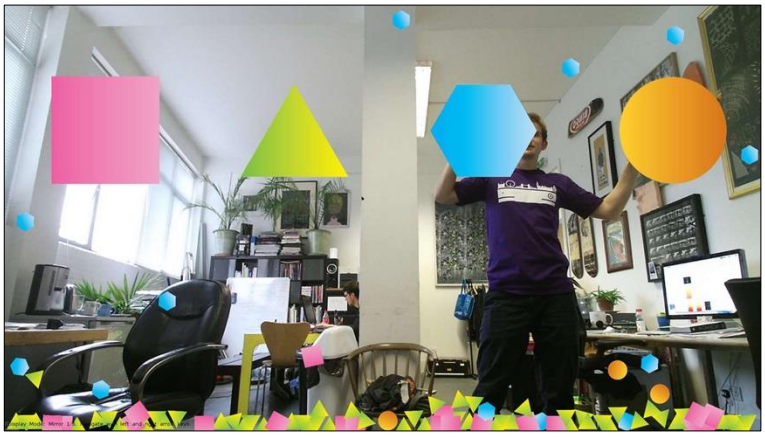

Figure 2. Reach

Balance combined sound and movement. The intention was for users to "throw" a ball by making a sound. The louder the sound, the more balls are released. When the balls hit another user's body this causes them to bounce around the room.

Alternatively, the user can use their arms to catch and gather the balls and balance them along the outstretched limbs (Figure 3). The user has the choice to remain still and keep the balls balanced or to move, tip or flick the balls to the floor. The gradual accumulation of balls allows for a pause in the action to observe the results of the effort, before deciding whether or not to redistribute them. The user responsible for making the sound also has the choice of whether to continue to add more balls, or to pause and observe.

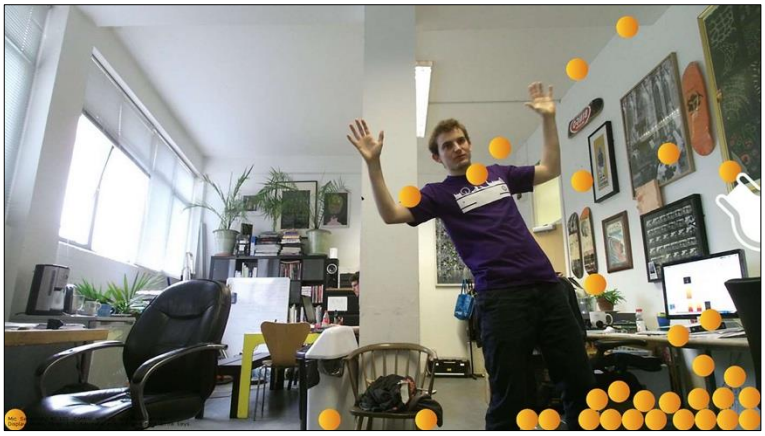

Figure 3. Balance

The idea for *Flow* was to keep the body in motion through limb movement. Even small limb movements could cause coloured lines to attach to the body, resulting in a dynamic pattern of lines (Figure 4). If the mover pauses, the lines gradually lose their opacity, providing the opportunity to reflect and observe as they gracefully fade, and to choose whether to re-invigorate the lines.

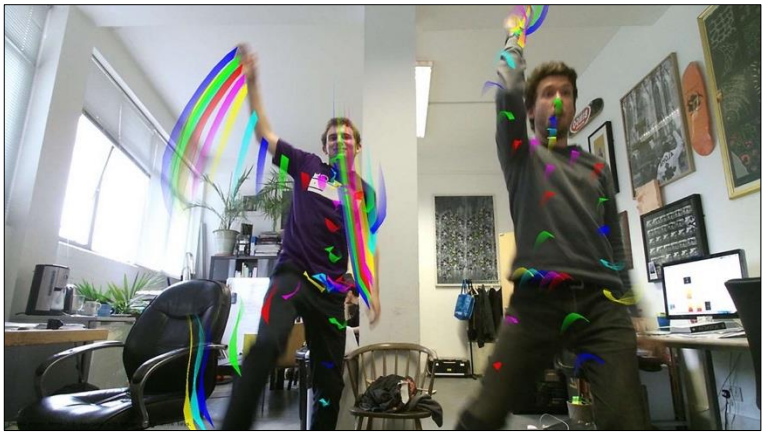

Figure 4. Flow

The prototypes were tested at the centre during weekly sessions over a period of six weeks. Generally, the feedback was positive, however, there were concerns that some service users could not detect their own body movement, particularly those with visual impairments. The video mirror was visually cluttered and the lines on the skeleton were too thin. Another persistent problem was the accuracy of detecting wheelchairs. When Somability was in *skeleton* mode a seated skeleton appeared over the chair, however it behaved quite erratically, sometimes disappearing altogether.

These problems were resolved in the next iteration of Somability. As well as fixing the wheelchair bug, we enlarged the skeleton effect, making it more of a feature, and introduced two new visual modes: *Silhouette* and *Effects*. *Silhouette* converted each body into a bold coloured shape by extracting background information so that the silhouette contrasted against a black canvas, and *Effects* showed only the effects created on a white background, with no bodily representation, thus producing a new art work with every movement.

CREATING THE SPACE FOR SOMABILITY

As confidence with the system grew the service team began to gather evidence of service user engagement as part of their regular monitoring procedure using the ASDAN Towards Independence framework[17]. ASDAN includes several modules that are specifically designed to accredit people with PMLD for their achievements, and to set targets for developing personal, social and independence skills. Of these modules, "Multi-sensory experiences" offered an appropriate match for addressing awareness of self and environment.

In addition, we regularly video-recorded the sessions and reviewed the material with centre managers as a method of refining the design. This had the advantage of enabling reflections on the impact of the project on the service as a whole. One reviewer commented that people who would not usually be expected to participate, as they had difficulty with self-awareness and limited movement, were self-initiating interaction. It was suggested that the high visibility of the projected movements enabled service users to demonstrate their awareness of their environment, enabling them to notice where and when an activity would take place, so they were able to independently choose whether or not to join in, and when to end.

Over the next six months, the support team continued to experiment with Somability in different settings and to reflect on their observations of multi-sensory experiences. The dining hall became the main arena for open-ended experimentation as it provided a large performance space. With the hardware (camera, laptop and projector) placed on a trolley, the space could be easily transformed to accommodate wheelchair users, and the software included adjustments for height, space and size, so that all users could share the experience. Service users who would normally take responsibility for the dinner trolley were invited to move the hardware and help set up the system. Chairs and wheelchairs were positioned on the periphery of the space leaving enough room for people to access the screen, and to choose how, and when, to move around the space. Projecting Somability on a large portable whiteboard permitted the opportunity to focus and mirror the flow of movement.

A classroom was transformed into a dedicated digital movement room, and a group of four service users was able to independently set up the equipment and run an activity. This in itself was expressed as transformational, in as much that service users were often given dedicated tasks, but it was unprecedented for them to choose to run an activity on their own.

The video reflection also provided comments on how valuable it was to be able to follow the cues of service users, and to have greater access to their "world" by watching how they entered and left the space, choosing when to join in. Support workers were also surprised by how much variation emerged within each application.

"Service user engagement is astonishing, even those people who are very difficult to engage are extremely keen to take part, and just the mention of having a session generates such excitement. I think the biggest surprise for me is the results we are seeing with individuals with ASD. To see people that find it very difficult to engage in an activity, who find it impossible to make a connection with another individual, can't even give eye contact, rushing to interact with both the equipment, and others taking

part in the activity, holding their hands, giving eye contact, really enjoying the whole experience, is priceless." Senior Development Officer

The perceived flexibility of the system was addressed in the reflections of support workers who remarked that the portability of the system enabled them to maximize on the available space and thus be more responsive to individual interests in their familiar settings. Staff were also able to experiment in their offices, and one wheelchair user took the equipment home. Observations on the benefit to health were also made, with particular transformations for those individuals who find more deliberate forms of exercise difficult. It was also noted that the software offered a "level playing field" between those who are more able and the more profound, complex and high dependency individuals.
The fact that the pacing and duration of a movement could express individuality meant that even very limited movement became a source of creative agency.
There were many recorded examples of a person beginning seated but then choosing to move in different ways as they saw the effects they were producing on screen. An increase in concentration, even when watching others, was also noted with instances of participants not noticing that it was time to go home. Simply pausing over a shape in *Reach* had a dynamic effect as the system interpreted the time spent on the shape as a hovering action, and more shapes "rained" down to collect along the surface.
Some wheelchair users needed assistance from support workers to enter and leave the space, however as the application *Flow* drew attention to the process of entering and leaving, moving forward and backward, the collective energy was rewarded.
Increases in expressive movement were reported, which appeared to encourage new, previously unseen, shared experiences as service users improvised on each other's movements, sometimes experimenting with the effects of joining bodies together. Some service users voluntarily entered the space while a peer was interacting and did not appear to be looking at the projected imagery, however, there was a reported increase in co-located interaction, evidenced in the mirroring and improvisation of posture. The process of seeing others becoming more active generated a sense of energy, and even those service users who were watching others interact from perimeters of the space, appeared to be more physically engaged.

"When we carry out an activity such as Armchair Aerobics, getting individuals to carry out the movements can be problematic, especially those who really need it, due to their carrying extra weight etc. With Somability we see individuals spending so much time 'making different movements' that we need to get them to rest. As well as our service users becoming fitter, we have seen other improvements – in fine motor skills (needed to press different shapes on screen), spatial and body awareness, increased turn-taking/sharing, relating to others and their environment, and also the concept of being able to make things happen, their every movement causing a responding reaction. These may seem like small things to us, but for many of our service users, these are significant leaps forward." Senior Development Officer

CONCLUDING REMARKS

The *Somability* project demonstrated how ordinary spaces, such as the dining room, sports hall, or even a small classroom, can be converted into an extraordinary creative environment. By making a direct and visceral connection to the movements of the body - the stretches, flickers, pauses – even those movements that seem involuntary or purposeless – the environment becomes a canvas for creative self-expression.
In the context of this project, those people who are generally marginalized, due to their physical or cognitive impairment, or their poor self-awareness and motivation, can be enchanted by seeing

themselves amplified in their everyday environments, and go on to experience social connection, inclusion and independence.

Since this time, the software has been released as a free download. The day service has widened participation to other adult learning centres, and many special education teachers are using the software with hard to engage learners.

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FROM THE CONFINEMENT HOSPITAL TO THE CONTEMPORARY HOSPITAL: EVOLUTION OF HUMANIZATION PARAMETERS MATERIALIZED IN THE HOSPITALS OF THE SARAH REHABILITATION NETWORK

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INTRODUCTION

The evolution of concepts concerning disease and treatment has had a decisive impact on the configuration of hospital space, which has developed over time from architectural models of patient confinement and segregation to contemporary models that contribute to healing patients. Given new disease profiles and increased life expectancy, an analysis of the evolution of the hospital building, in terms of the humanization of its spaces, is extremely important for understanding its new configuration.

This article identifies the factors that have induced changes in the evolution of hospital buildings and specific characteristics shaping hospital construction, through correlations between cultural views of disease, the role of hospital buildings for the patient, and the construction characteristics of hospitals over time. The humanizing parameters of different hospital typologies are identified chronologically, with the contemporary hospital being represented by the SARAH Network of Rehabilitation Hospitals (the SARAH Network), designed by the architect João Filgueiras Lima (Lelé).

New twenty-first century hospital models, faced with the rise of incurable chronic and age-related diseases resulting from increases in life expectancy, have transformed the spatial organization of the technological hospital into a design dedicated to the humanization of spaces, which influence the healing and well-being of patients who remain in hospital for longer periods. In this context, the SARAH Network stands out through the completeness of its humanizing parameters within the developed models, and provides a reference point in the search for well-being and healing. The SARAH Network has holistically incorporated evolving human-focused characteristics of hospital design, and demonstrates the latest approaches to rehabilitation within an increasingly "liveable" environment.

THE EVOLUTION OF HOSPITAL ARCHITECTURE

From antiquity to the mid-eighteenth century in the European context, the treatment of disease was linked to the sacred, which resulted in the use of religious buildings as architectural models for places of hospitality and treatment. Disease itself could be seen either as a consequence of a violation of

some social or religious taboo, provoking the reaction of offended ghosts, spirits or gods, or as a curse inflicted by sorcerers.[1]

Infirmaries were unhealthy environments where natural lighting was practically non-existent. It was believed that the diseases originated in miasmas, that is, foul odors emanating from organic matter in putrefaction. As the wind was considered a contaminant and carrier of miasmas, windows had small dimensions, adding a dark and frightening atmosphere to rooms.[2] The architect's role was restricted to building ornamentation, which was primarily religious.[3]

The predominant architectural form of health-oriented establishments became the nave, basilica, or chapel. Patients were generally only separated by sex, leading to the accumulation in the same space, and sometimes in the same bed, of the most diverse cases. [4]

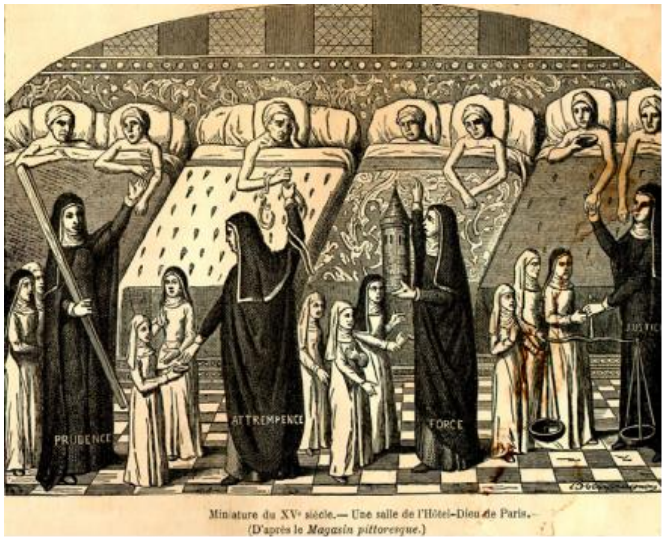

Figure 1. Patients sharing the same hospital bed at the Hôtel de Dieu in Paris.[5]

The few hospitals located in urban settlements and at commercial crossroads were usually associated with death, and were intended more to protect those on the outside. Once inside, in custody, there was little hope of recovery.[6] Hospital structures were models of confinement.

Hospitals only assumed a healing mission in the middle of the eighteenth century, due to advances in medicine and science. In describing hospitals at the end of the eighteenth century, Foucault claimed: "The architecture of the hospital became a factor and instrument of healing. The exclusion hospital, where patients were simply sent to die, no longer existed".[7] From a depository for the dying, the hospital became a place of healing, of returning the individual to society, in accordance with the newly developed understandings of human society.[8]

Disease ceased to be considered a blow of fate and became recognized as a pathological fact.[9] The presence of a doctor in hospitals became obligatory after 1770 and was gradually required for longer periods, until the hospital became known as a privileged place for medical practice.

The French physician Jacques-René Tenon (1724-1816) carried out research on the functional and operational aspects of French hospitals, based on scheduled visits and a detailed analysis of their care conditions. He associated the patients' healing with the quality of the hospital environment and generated guidelines, published in *Mémoires sur les Hôpitaux de Paris*. The guidelines covered the organization of the flow of people and materials, the size of the wards, the maximum number of beds and their spacing, and especially the ventilation conditions of the hospital environments.

The architectural solutions studied at the time, to address the expectations of the new guidelines, culminated in the creation of the pavilion model. Developed by the architect Bernard Poyet (1742-1824), the principles he outlined guided hospital architecture throughout the nineteenth century and at least until the 1920s, that is, a preference for long parallel pavilions, ordered on a regular basis, according to various symmetrical systems.[10]

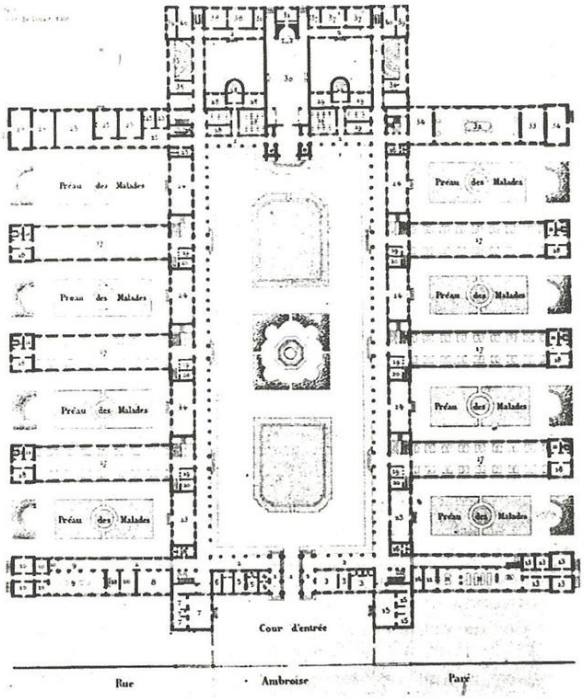

Figure 2. Plan of Laribosière Hospital, Paris, Arq. Martin Pierre Gauthier, 1839.[11]

Figure 3. Laribosière Hospital, Paris, Arq. Martin Pierre Gauthier, 1839.[12]

The nurse Florence Nightingale (1820-1910) was a strong advocate of the pavilion style and the precursor of the planning principles that gave rise to the modern hospital. The established standard, known as the "Nightingale ward", represented a significant advance, since it fixed a maximum number of patients per ward, along with establishing conditions for ventilation and separation between beds.

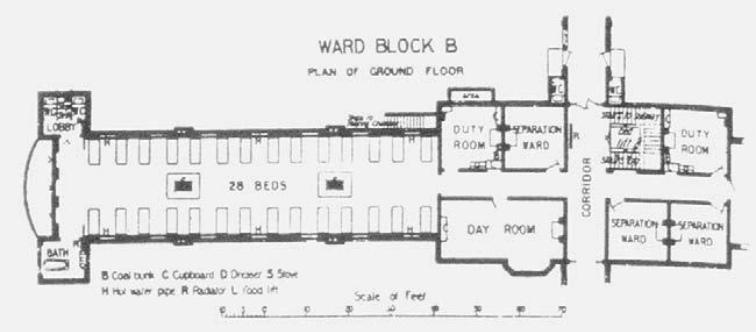

Figure 4. Plan of a Nightingale type ward.[13]

Figure 5. Nightingale type ward.[14]

In the first half of the nineteenth century several critiques were made of the pavilion model due to its extensive size and the demise of the miasma theory, which made isolation between pavilions and considerations of cross ventilation redundant. These criticisms, coupled with new theories about disease, pharmaceutical and germicide industrialization, the incorporation of technologies into medicine and advances in civil construction, gave rise to a new technological hospital model, predominant in the late nineteenth century and throughout the twentieth century. As medicine incorporated innovative technologies to increase the effectiveness of diagnoses and treatments, hospitals became true "healing machines" and the therapeutic function of architecture was reduced, because in a medicine based on treatment, this function became exclusive to physicians and the powerful pharmaceutical industry.[15]

The predominant architectural style of the technological hospital was the vertical mono-block, involving the intensive use of metallic structures and later reinforced concrete, and made viable through the use of elevators. The creation of the mono-block style was undoubtedly due to a better medical understanding of disease transmission developed from the formulation of bacterial theories and of the "new paradigm established from the discoveries of Louis Pasteur".[16]

Technologies assimilated from naval engineering resulted in enclosed spaces, with lower ceiling heights, a decrease in openings, and with windows incorporated to solve issues with air conditioning and ventilation in special environments such as operating rooms. There was a subsequent indifference to the humanization of building environments and an increase in electricity consumption.[17]

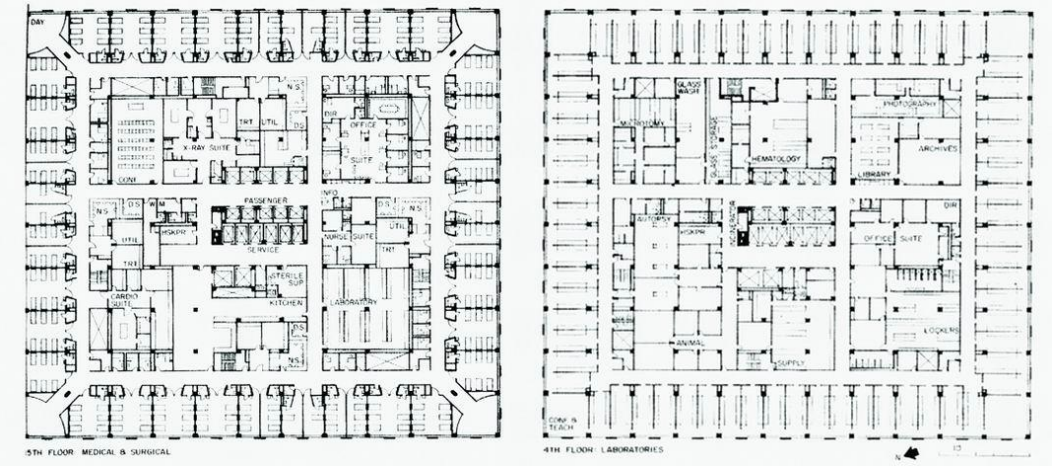

Figure 6. Plans of the 15th and 4th floors of Bellevue Hospital, New York City, 1964.[18]

From the last decades of the twentieth century hospital medicine began to value, along with the goal of curing illnesses, the mission of caring, and started incorporating solutions aimed at the well-being of those using hospitals. Caring has come to assume the same importance as curing illness since a major part of the changes in disease profiles has been due to the growth of chronic illnesses with no expectation of cure, as well as diseases related to old age resulting from increasing longevity. Such changes require the permanent care of patients who remain for longer periods in hospital settings, which were designed primarily as places for curing illness.[19]

Theories and methods related to patient-centered hospital spaces arose. These explored the benefits of varying an environment by studying the primary reactions of people to certain stimuli, and provided an understanding of the type of spaces that should be designed.

The *Planetree* foundation, a non-profit organization created in 1978 and specializing in the humanization of medical and hospital units, was fundamental in the evolution of architecture as a therapeutic instrument. The foundation promotes a certification of humanization for health care facilities worldwide. This represented the beginning of the Patient-centered care movement, whose principal milestones involved the foundation of the Center for Health Design in the United States (1993) and the publication of important scientific studies led by Roger Ulrich, a professor at Chalmers University of Technology in Sweden, which culminated in the Evidence-Based Design (EBD) approach.

The hospital environment is now known to affect patient recovery through the possibility of significantly reducing stress as well as influencing and promoting the healing process.

The configuration of hospital spaces interacts with medical care through ergonomic aspects, involving addressing technical and functional needs, as well as the patient's health needs, alongside attempts to combat disease and protect individuals from infections, while assuming an important relevance for the subjective perceptions of the patient and the healthcare teams involved.

The SARAH Network

In 1980 the first hospital of the SARAH Network, a group of public hospitals designed by the architect João Filgueiras Lima (Lelé), was inaugurated in Brasilia. Specializing in the rehabilitation of people with physical and motor disabilities, the SARAH Network currently comprises hospitals in Brasília (1980), São Luís (1993), Salvador (1994), Belo Horizonte (1997), Fortaleza (2001), Brasília-Lago Norte (2003) and Rio de Janeiro (2009).

The architecture of the SARAH Network breaks with the prevailing twentieth-century configuration of vertical mono-blocks dominated by functionalist architectural styles until the mid-1960s.[20] It synthesized technical-constructive and conceptual principles with an emphasis on the promotion of more pleasant and humanized architectural spaces, and anticipated features of more contemporary hospitals that were little explored in hospital architecture previously.

Technology was accepted as a necessary component to create more humane and open spaces. The architectural form was considered part of a critical reflection on time, space and being, and not necessarily subject to a closed formula (agreements, norms, stylistic categories, typologies), but defined rather by a flexible and open methodological matrix that allowed itself to be molded to the objective and subjective realities of the contemporary world. The architectural form was seen as being in constant transformation, and through acknowledging contemporary realities, it could bring life to spaces that, more than being compartmentalized areas of construction, were spaces where activities took place and where human relations were built.[21]

The humanization of the SARAH Network is manifested in solariums, terraced gardens and large rehabilitation areas, as well as in the fluidity of the internal spaces, generally surrounded by hollowed dividing panels, that allow greater proximity between users. The uniqueness of such spaces is enhanced through their integration of natural and artistic components, which is fundamental for the positive perceptions and well-being of all the hospital users.

Arte e cor

Art is present in all the hospitals of the SARAH Network, both indoors and on the facades. Works by the artist Athos Bulcão give life to walls and lend colour to what was previously concrete, allowing artistic elements to break the monotony of large neutral surfaces. The artistic object is the architectural object; it complements the space, where surfaces devoid of interest, such as facades, gables, panels, partitions and walls are transformed into works of art that animate the environment with colours, contours, reliefs and geometric patterns.

10

Figure 6. Metallic panel with painted hollow elements, designed by Athos Bulcão - Sarah Salvador Hospital.[22]

Figure 7. Corridor of the Sarah Lago Norte Hospital – Brasília.[23]

Figure 8. View of the outside area of the Sarah Hospital Salvador.[24]

Figure 9: Pivoting panels with multi-colored banners in Sarah Lago Norte.[25]

Living Spaces

Ample spaces for sports and complementary activities, such as dance and art workshops, are located in play-friendly rehabilitation areas, which can be configured as internal and / or external areas in all the SARAH Network hospitals.

Figure 10. Area outside the Sarah Hospital Rio de Janeiro.[26]

Figure 11. Internal patio of the Sarah Hospital Fortaleza.[27]

Integration with the natural environment

Integration with the natural environment ensures the preservation of the original vegetation and the establishment of local plant varieties. This can contribute to creating positive perceptions and stimulation within the routine of employees and patients, who can interact easily with nature both externally and internally in relation to the building, and leads the natural environment to become an integral part of the healing process.

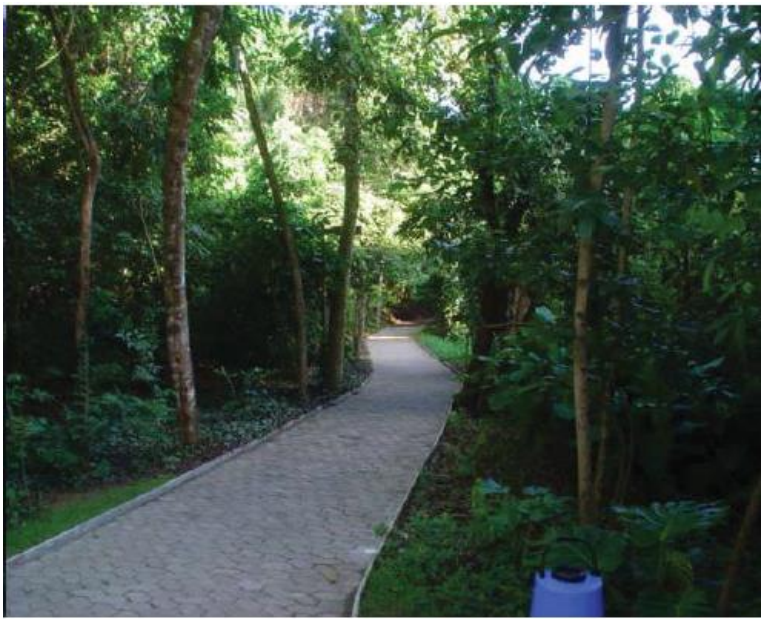

Figure 12. External garden of the Sarah Hospital Salvador.[28]

The layout of the SARAH Network buildings, in addition to capturing wind and sunlight, allows the visual potential of the landscape to be explored through communication between the internal and external areas established by large openings and through using surrounding hollowed, translucent or transparent panels.[29]

Figure 13. Integration of the Sarah Hospital Brasília Lago Norte with Lake Paranoá.[30]

Figure 14. Tilting wooden panels that open to the outside and covered with translucent material - Sarah Lago Norte.[31]

Figure 15. Garden integrated into the main hall – Sarah Lago Norte. Source: Lima (2012, page 222).[32]

Figure 16. Integration with garden through pivoting panels - Sarah São Luís.[33]

The prevailing winds and sunlight are captured by elements particular to the SARAH Network. Underfloor ventilation galleries, nebulizers that expel water to lower air temperature, and sheds (lighting and exhaust) are the main components of the natural ventilation system that provides comfort and well-being to patients.

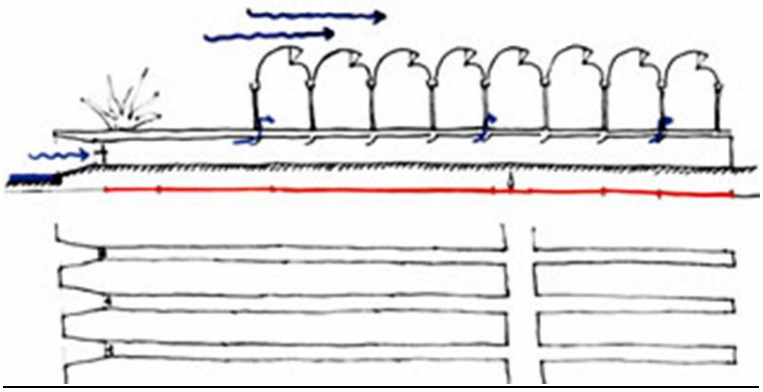

Figure 17. Schematic cut of the natural ventilation system of the Sarah Hospital Fortaleza.[34]

Terraced gardens and solariums

The terraced gardens and solariums are linked directly to the infirmary or to the physiotherapy areas, in an integrated configuration, whereas normally they border each other. Their fundamental function is to humanize infirmary spaces, contributing to the psychological balance of patients who socialize and take daily sunbaths, as well as reducing cross-infection.

Figure 18. Terraced garden of the Sarah Hospital Brasília.[35]

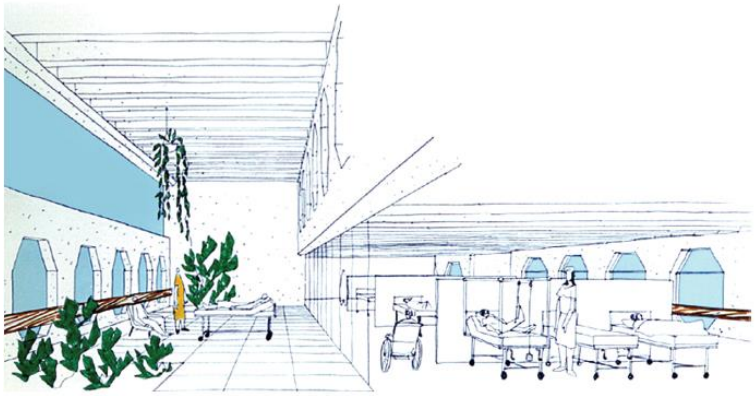

Figure 19. Integration of the infirmary with the terraced garden.[36]

Figure 20. Solarium at the Sarah Hospital Belo Horizonte.[37]

Figure 21. Solarium at the Sarah Hospital Rio de Janeiro.[38]

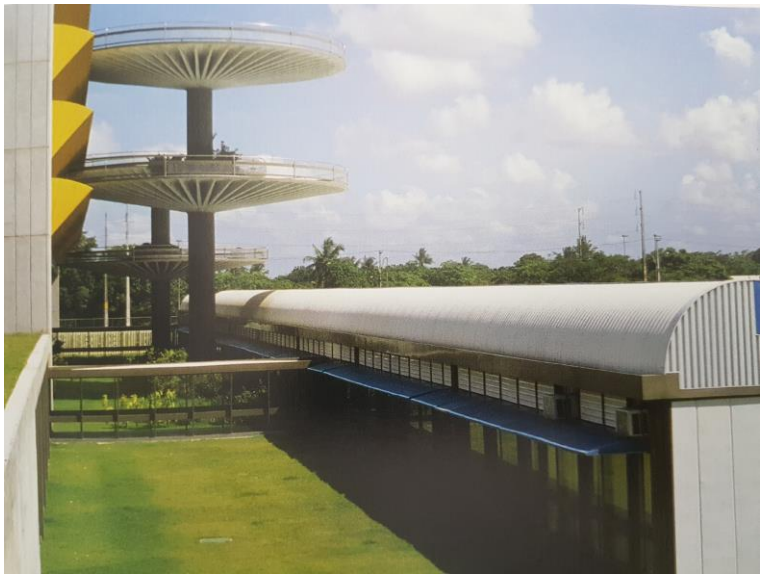

Figure 22. Solariums at the Sarah Hospital Fortaleza.[39]

HUMANIZATION PARAMETERS AND THE PROFILE OF THE CONTEMPORARY HOSPITAL

The correlations between cultural views of disease, the role of the hospital building for the patient and the construction characteristics of hospitals over time allow an identification of the factors inducing changes in the evolution of hospital buildings and specific aspects shaping construction of the contemporary hospital.

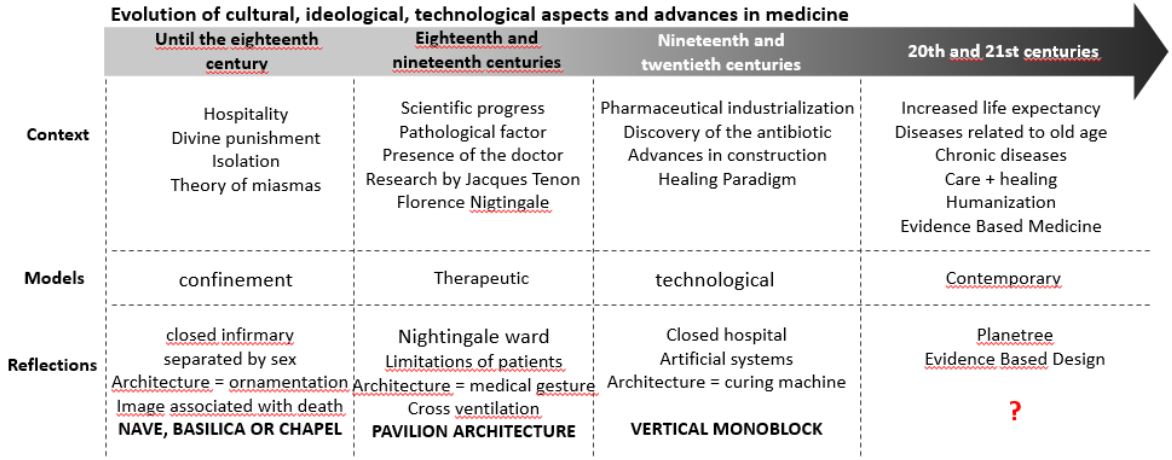

Figure 24. The evolution of hospital architecture.[40]

It is therefore possible to identify parameters of humanization in respect of different typologies of hospitals in chronological order, and to show that the contemporary hospital consolidates them into a model of patient-centered care.

Table 1. Parameters of humanization over time.[41]

Hospital Type	Chronology	Cultural view of disease	Role of the building for the patient	Characteristics	Humanization parameters					
					Ornamentation	Gardens	Natural ventilation	Natural lighting	Integration with nature	Living spaces and activities
Confinement Hospitals	Early middle ages until the end of the 18th century	Divine punishment	Custody, confinement and segregation	Nave, basilica or chapel. Without limitation for the number of occupants. Thick walls and small openings for ventilation and lighting.	●	○	○	○	○	○
Therapeutic Hospitals - pavilion model	End of 18th century until the middle of the 19th century	Pathology	Recuperation and healing	Organization of flow of people and materials. Size of the wards and limitation of the number of beds. Ventilation and more open to the environment. Parallel and regular pavilions. Central patios with gardens.	●	●	●	●	○	○

Therapeutic Hospitals - technological model	Middle of 19th century until the end of the 20th century	Pathology	Custody	Vertical mono-block. Reduced openings for ventilation, natural lighting and outdoor viewing. Dependence on ventilation and mechanical air conditioning. High energy consumption.	○	○	○	○	○	○
Therapeutic Hospitals - humanized model	End of 20th century to the present	Pathology	Recovery, healing, care and well-being	Concern about environmental comfort. Concern about energy efficiency. Appearance of solariums and activity areas. Light partitions between spaces and ornamentation. Integration of the hospital areas with the natural environment.	●	●	●	●	●	●

The evolution of these humanization parameters delineates the profile of the emerging contemporary hospital, and is present in the architecture of the SARAH Network, making it an important reference point as a model for healthcare architecture.

FINAL CONSIDERATIONS

Hospitals are no longer simply healthcare spaces, but have also become wider social spaces extending beyond the medical relationship with the patient. Unlike the great modern hospital complexes of the twentieth century organized through extensive anonymous and aseptic wings, the contemporary hospital comes close to the experiences of everyday life, affirming all the complementary functions that allow and foster everyday living. Rather than primarily devoted to healing, hospitals have become true living spaces.[42]

With contemporary hospitals being inhabited by patients and visitors for prolonged periods, it is important that the hospital promotes the well-being of the patients and enables them to play an active role in their own rehabilitation. The formal and compositional aspects of the SARAH Network, through their living spaces, represented by terraced gardens and recreational areas of rehabilitation, as well as through the fluidity of spaces and the art embodied in the architecture and integration with nature, positively influence patient recovery and the healing process. This achievement ensures that all the parameters of the humanized contemporary model are met, facilitating positive sensations and perceptions to promote the well-being of medical teams, visitors and patients.

Thus, it is likely that studying the humanizing architecture in the "living" areas of the SARAH Network will contribute to understanding how patients are affected by hospital buildings, as well as helping other projects to incorporate these humanizing elements in a manner adjusted to their reality and design context.

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(IN-) EQUALITY BEFORE THE LAW – HOUSE ADAPTING POLICY IN SWEDEN

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INTRODUCTION

In order for people with different disabilities to be able to live an independent life, it is required that the environment is adapted, accessible and able to support a vulnerable life situation. Worldwide, approximately 15 percent of the population is estimated to have different disabilities[1]. In Sweden, 16 percent of the population is estimated to have one or more disabilities between the ages of 16 and 64, which corresponds to more than 1 million people[2]. This study will highlight the relationship and consequence between two areas: disability policy and the interpretations of the law in Sweden. An interest in housing adaptations has been emphasised in research from different perspectives, for example the differences in housing allowance costs in the municipalities in Sweden[3]. Even if the support system and legalisation system in Sweden are well developed, there is not granted that the application for housing adaption will be approved, from various reasons. And as previous studies has showed, property owners usually get denied measures in bathrooms because there is an increased risk of consequential injuries, and that it is costly to restore the property if and when the person moves[4], and there also seems to be a gender difference not only related to the approved application, but also related to the cost of the measurements[5 6].

However, it is important to study to what extent the interpretation of legislation at the municipal level is consistent with current practice in the field and how it harmonizes with the UN Convention[7]. Thus, the interpretation of the law on a municipal level is unequal, the praxis in some way contradicts not only the law itself, but also the UN convention, which needs to be problematized further. The aim in the study is to highlight the rational and discrepancy between cases of approved or declined appeals of housing adaption in the court of Western Sweden. The main research question in the paper is to analyses which conditions constitute an approval of appeal (e.g. *the disabled person gets the adaption approved*) or decline of appeal (e.g. *the disabled person gets denied the adaption*)?

Material and method

The conducted study is based on court documents from Western Sweden related to appeals on house adaptations during the years 2010-2016 (n=53). The court documents was collected through personal contact with the Court of Appeal in Gothenburg, administrating court cases from the counties: Halland, Skåne, Värmland, Örebro, Västra Götaland and Swedish authorities abroad. The study was designed as a case study, to enable a within- and cross-case analysis[8 9]. The chosen design enable an elucidation and comparison of the diverse adjugment[10]. The analysis was conducted with a mixed

method approach based on a deductive coding, e.g. the documents was coded thru categorizing gender, age, localization, room, type of adaption and dwelling situation[11]. The first analysis was by using descriptive statistics and cross tabulations, to map the adjugments from the named fixed categories[12] In addition, the adjugment was summarized and analyzed as a qualitative content analysis by coding rationale communicated by the court for decline or approve the appeal[13].

Ethics

The conducted study has acknowledge the ethical principles related to disability research in general[1415]. Moreover, with respect for the personal integrity and to avoid harm, no adaptations are cited in the result section and the data is also presented as clustered and not on unit level[16].

RESULT

In this section first the general univariate statistic will be presented, thereafter the main result related to factors affecting the adaptations will be presented. In the analyzed court cases females was overrepresented, approximately two thirds of the cases involved a female (67,9% compared to 32,1% male), and individuals over 50 years of age was appealing previous court adjugments in a vast The appeals in relation to dwelling situations was almost identical, 47,2% concerned adaptations in apartments block and 52,8% villas, but the appeals related to different localizations (table 1). As seen in table 1, the shared, common areas in apartment blocks relates to the vast of appeals (e.g. entrances and stairs) and in villas the indoor areas related to bathrooms and stairs are most frequent. Also, some localizations are not relevant in the different dwellings, for example terrace and garden are only related to villas and entrances in apartments block which explain some of the internal variations. In general the indoor areas seems similar in both apartments and villas and consider rooms as bathrooms and kitchens or material and interior (e.g. floorings and doors).

Tables 1: Distribution of appealed adaptations decisions 2010-2016 (n=53).

General level	Apartment blocks (n=25)	Villas (n=28)
Bathrooms (18.9%)	Entrance (36.0%)	Bathrooms (21.4%)
Stairs (17.0%)	Stairs (16.0%)	Stairs (17.9%)
Entrance (17.0%)	Bathrooms (16.0%)	Terrace/garden (14.3%)
Other (9.4%)	Utility room (12.0%)	Annexe (14.3%)
Annexe (9.4%)	Kitchen (4.0%)	Other (14.3%)
Terrace/garden (7.5%)	Door (4.0%)	Kitchen (10.7%)
Kitchen (7.5%)	Flooring (4.0%)	Door (3.6%)
Utility room (5.7%)	Annexe (4.0%)	Flooring (3.6%)
Doors (3.8%)	Other (4.0%)	*Utility room (0%)*
Flooring (3.8%)	*Terrace/Garden (0%)*	*Entrance (0%)*

Total: 100%	**Total: 100%**	**Total: 100%**

Patterns of declined and approved adjugments

A majority of the court cases was declined (66%), and it was not any gender differences between approved or declined adjugment in the court, but age had some smaller influence. the age group between 50-65 years of age had a smaller degree of approvals compared to the other age groups in the analysis (+ 16,6 units of percentages compared to 0-18 years, 34-49 years and 66-80 years and +29.5 units of percentages compared to the age group 80 or above). Despite of age, the dwelling situation seemed to be the best predictor of adjudgment in general, and residential in apartment blocks had a higher degree of approvals compared with residential in villas (+11.4 percentage units). But, this patterns was merely only due to the outdoor or common areas in the apartment block, indoors adaption was more approved in the villa's (Table 2).

Tables 2: Approved adjugments 2010-2016 (n=18)

	Indoor adaption	**Outdoor adaption**
Apartment blocks	22.2% (4)	33.3% (6)
Villas	38.9% (7)	5.6% (1)
Total	**61.1%**	**38.9%**

As seen in table 3 the appeals was also related to age specific needs for adaptation and specific localizations. Six cases adhered to individuals under the age of 18, and concerning indoors adaption mainly related to rehabilitation which was considered to reach by redisposition of the existing surfaces in the most declined cases. In the second age group, 19-33 years only one case was processed regarding the indoor environment, which also was approved in court. Also the age group between 34-49 years had indoors related cases, with a high degree of declines. In the age group 50-65, all indoor cases and all outdoor adaptations related to villas was declined, in addition also four out of six related to outdoor adaptations for apartments was declined. Similar patterns was also merged in the age group between 66-80, there only one case in the indoor environment was approved, and none in the outdoor environment related to villas, but four out of seven in the apartment blocks. In the oldest age group, five of eight indoors adaptations was approved and all four in the common outdoor area related to apartment blocks, but the single case in the private yard related to be dwelling in a villa was denied.

Tables 3: Age, localisation and appealed adaption decisions 2010-2016. (n=53)

Age group	**Indoor**	**Outdoor**	**Declined by court**
0-18	11.3% (6)	-	7.5% (4)
19-33	1.9% (1)	-	-
34-49	11.3%(6)	-	7.5% (4)

50-65	7.5% (4)	15.1% (8)	18.8% (10)
66-80	9.4%(5)	18.8% (10)	18.8% (10)
80+	15.1% (8)	9.4%(5)	13.2% (7)

In general, it is very hard to define statistics with small numbers as anything else then tendencies of patterns. But in the qualitative text analysis, the discrepancy between adjugment between apartments and villas seems to be due to the individual's responsibility and references to other laws.

In cases regarding apartments, the declined cases was mainly motivated by telling the individual to find other solutions, for example use the back entrance door instead of the front, find other aids which can under ease the cooking or use the communal bath in the area for rehabilitation. In cases regarding villas that the residence can be redistributed for main functions or that adaption is not necessary, since the objectives are included in normal maintenance or adhere to other laws connected to the individual's responsibility. Mainly, economic reasons was adhered in villas, such as adaption was not supposed to increase the value of the residence, create new function (e.g. utility rooms or annexes) or to customize the residence to current standard.

On the other hand, the approved appeals was more vaguely formulated regarding villas compared to apartments, and often based on subjective interpretations of the residential' situations, for example remote control to use the villa alarm was approved in one case, since it was a necessity for being able to leave or entrance the home, but another case the adaption to been able to use the garden was declined since it was not necessary to perform hobbies. Approvals related to apartment blocks was more related to the possibility to use the whole apartment, and also often returned to the property owner, since it mainly was related to common areas in the block (e.g. stairs, elevators and entrances).

Conclusion

In this study the main results which will be elaborated further on in the discussion can be concluded as that the court appeals regarding house adaption was differentiated depending on actual dwelling situation. In general bathrooms and stairs was the two most appealed localizations, but in apartments adaptations of the shared common areas were the most appealed and in villas bathrooms. There was also an age-specific patterns of appeals, tending that indoor adaptations were common in the age up to 49 years, thereafter outdoor adaptations were more common. In general, age had a small influence on the adjugment, but the most important factor seemed to be dwelling situation (e.g. residential setting), and the adjugments, either it was declined or approved was often motivated by redirecting the responsibilities, either to other laws, individual responsibility or to the property owner, and in some sense creating a catch 22 for the individuals.

DISCUSSION

In contrast to previous research, this study did not find a gender difference between approved and denied appeals, but this can be due to the limited scope and/or the females´ political poverty society, which reduce the chances to appeal. The study are conducted at the second instance in the court system, there is hard to estimate how many that get approved adaption in the first instance or how many with denied court cases whom appealed, even if all has the right to appeal a decision. Yet, to be able to appeal, requires that the individual have received information about their rights and have support in the process.

This article shows that it is hard to get house adaptions, mainly due to the complexity in the interpretation of the different laws related to housing policy. Mainly laws related to responsibility as a house owner, are different related to the type of dwelling, such as redistribute the living area, not do any adaption related to increasing the property value in villas or in case of apartments return the case to the property-owner. This passing of responsibility might result in decreasing the personal rights related to an active life, decrease quality of life and higher injury indices.

Based on the result of the study, and the upcoming challenges in society with an ageing population, there seems to be a need to address the disability rights, and mainly the accessibility in society, to grant everyone a high degree of life quality. According to the United Nations Convention on Human Rights for Persons with Disabilities, everyone should be entitled to live an independent life and where environments should be accessible to all citizens[17]. Article 19 in the Convention states: "Persons with disabilities have the opportunity to choose their place of residence and where and with whom they live on an equal basis with others and are not obliged to live in a particular living arrangement"[18]. But how can this be made possible? And that actors should be engaged in the process? Since, as it seems now, factors as age and dwelling situation are conditioning the courts adjugments.

Recommendation for further research

Our study indicates needs of further research in a very important area: housing conditions and housing adaptations for people with all types of disabilities, to understand not only the conditions but also the consequences of the juridical decisions. It would be of importance to follow cases during the whole process, to see whom gets right in the first instance, second instance and third. But, also to analyses which cases that are denied all the way, to narrow down if certain groups are more vulnerable in the court system. Another important issue for further research is how to communicate support and information to the person concerned in a simple and practical manner. Further studies could also focus on the experiences of the involved actors (persons with disabilities and their related) of the role and functioning of the legal system, and how they experienced the outcome and the outcome of the judicial review. A third issue that would be important in the future is important in explaining how judicial decisions affect the quality of life for the people and the consequences it has for human in the short and long term.

Limitations

The main limitation is that the conducted study relays on a small selection of data, representing the adjugments from one court and one geographic region, which undermine both the degree of generalization and the degree of comparison. Nevertheless, the small n, enable an in-depth qualitative analysis, which revealed a quit complex pattern which condition the outcome[19].

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THE USE OF LIVING WALLS IN EGYPTIAN RESIDENTIAL BUILDINGS: IDENTIFYING THE PERCEPTIONS AND CHALLENGES

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INTRODUCTION

The need for a better use of scarce planetary resources through appropriate architectural designs has never been more evident than it is today. Among the important advancements in this area is the use of wall greeneries for the reduction of energy consumption, carbon emissions, and urban temperatures in major municipal areas. 'Living walls' can be an important exertion to turn Mega cities, such as Cairo, into a better urban environment – both aesthetically and ecologically. It can actually be an ecological solution to the concrete jungle in informally planed areas of the capital. Although this may be true, this need is poorly reflected in actual residential buildings' design. Lately, several projects aiming to green the city have been emerging all over the urban metropolis through governmental and NGOs attempts. Such efforts need a great awareness of the economic, social, and environmental benefits of green walls and facades across Egypt. By overcoming such challenges and taking advantage of such opportunities, a reasonable ratio of green areas can be reached in these areas soon.

The paper performs an investigation on the importance of Living Walls as a new architectural approach in Egypt while focusing on advancing the development of the market for green facades products and services. It also debates how informally planned residential settlements in Cairo could be improved and hence the quality of life of most of its residents through the development of the vertical gardens strategy.

HEALTH AND WELLBEING PROSPECTS OF LIVING WALLS

The prospects and benefits gained due to the use of urban vegetation are the subject of researches and investigations starting from the early seventies. The integration of vegetation on buildings, through green roofs or vertical greening, have a reflective influence on the climate of urban areas and the wellbeing of its residents, and the relative lack of vegetation in many cities has been cited as one of the main causes of the urban heat island.[1] It also allows the procurement of a relevant improvement of the building's efficiency, ecological and environmental benefits, and it can be an opportunity to realize more "urban forestry". By using green walls, the problem of limited spaces or lack of land is minimised, as it covers the building façade, thus the air quality in the urban area with high rise and skyscrapers can also be improved.[2] They also contribute to vertical mixing of air, so the temperature over them tends to be lower than the surrounding areas built. Warm air rises over the hard surfaces and is replaced by the fresh air and reducing the heat island effect. [3] Previous studies show that if a skyscraper has a plant ratio of one to seven, then the façade area is equivalent to almost three times the area. So, if the building is covered two thirds of the façade, this have contributed to doubling the

extend of vegetation on site. The skyscraper can become green, either vertically or hydroponically, thus increasing the organic mass on the site.[4]

Mainly, Plants can assist in the passive cooling of the city through two mechanisms, direct shading and evaporate transpiration. Depending on the density of the plants in the green walls, the temperature reduction will not only affect the building, but also to the urban environment.[5] Plants, especially trees, have been known to be effective scavengers of both gaseous and particulate pollutants from the atmosphere in the urban environment. Urban Greenery can improve the air quality by filtering out airborne particles in their leaves as well as by absorbing gaseous pollutants through photosynthesis.[6] This phenomenon also releases oxygen to the atmosphere and reduces carbon dioxide. Additionally, many interior living walls are designed to improve indoor air quality through bio-filtration. Carbon dioxide and harmful toxins such as Volatile Organic Compounds (VOCs) are absorbed through both the plants and planting medium as indoor air is drawn through the living wall.[7] Moreover, urban greenery is essential for dust control and the generation of humid cold air, acting as a local natural 'air conditioning'.[8]

Urban green areas and plants can be considered as an adequate alternative habitat for native wildlife which may enrich the ecological quality and health of the environment as well as provide additional emotional, intellectual, social and physical benefits to the residents. Plants roots also play a role in filtering the impurities in the water before it enters a groundwater aquifer. Impurities, such as nitrogen and phosphorus, will tie together with some type of soil. Plants can reduce the amount of these impurities in the soil by using nitrogen and phosphorus in the plant growth.[9]

Lastly, plants can be used as sound barrier as they can reduce the noise perceived by the receiver. In the case of green walls, plants in the green walls will absorb the frequencies of the sound. Thus, reducing the noise pollution in the urban area.[10]

FAÇADE GREENING AND LIVING WALL SYSTEMS

Façade Greening, also commonly referred to as a "vertical garden", is a descriptive term that is used to refer to all forms of vegetated wall surfaces. It is the result of greening vertical surfaces with plants, either rooted into the ground, in the wall material itself or in modular panels attached to the façade and can be classified into Green Façades and Living Walls systems according to their growing technique as shown in Figure 1.[11] Green façades are based on the use of climbers attached directly to the building surface or supported by cables or trellis. In the case of an indirect greening system, where cables or meshes support vegetation, numerous materials can be used as a support for climbing plants such as steel (coated steel, stainless steel, galvanized steel), different types of wood, plastic or Aluminum. Indirect greening systems can be combined with planter mediums at different heights of the façade. [12] In this case the system requires nutrients and a watering system, if the rooting space is not sufficient. If nutrients and a watering system are needed, it can be defined as a living wall system.[13] Living wall systems, also known as green walls, green façades, bio walls or vertical vegetation, are constructed through the use of modular panels containing its own soil or other artificial growing mediums, based on hydroponic culture, using balanced nutrient solutions to provide to the whole or part of the plant food and water requirements. [14]

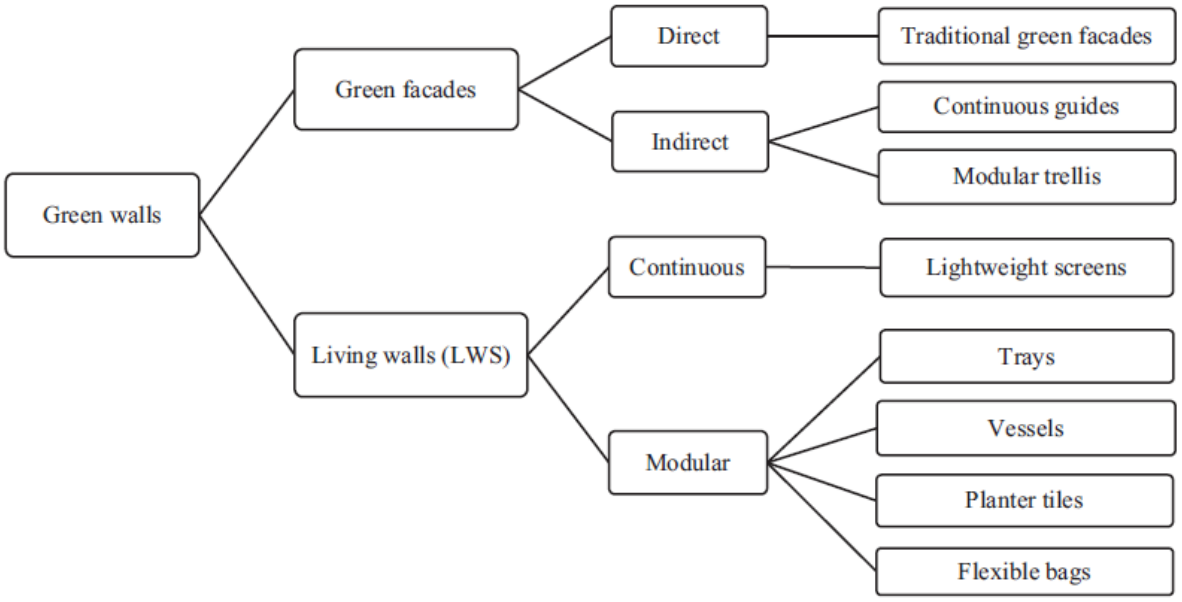

Figure 1. Classification of green walls, according to their construction characteristics[15]

It is important to note that similar to green roofs systems, a difference can be made between extensive systems of green walls, namely those of easy implementation and minimum future maintenance and intensive systems, with a more complex implantation which requires a high level of subsequent maintenance. Therefore, it is necessary to differentiate them and study individually their suitability as passive systems in the energy efficiency of buildings.[16]

Living walls are a relatively new area of innovation in the field of wall cladding. They developed to allow the integration of green walls in high buildings. Living walls allow a fast coverage of large surfaces and a more uniform growth along the vertical surface, to reach higher areas and adjusting to all kinds of buildings. They also allow the combination of a wider variety of plant species.[17]

Living wall systems allow the development of new aesthetical perceptions of green walls, based on the design of artistic patterns with plant species, variations in color, texture, foliage forms and density, strength and growth. These new designs brought a wider variety of plant species to green walls, allowing the combination of shrubs and grasses if their watering and nutrient needs are taken into account.[18]

URBAN GREENING CHALLENGES IN EGYPT

Egypt isn't precisely prominent for its immense urban green spaces and revolutionary environmental strategies. Its capital, Cairo, is the prime city in the region and it's also one of the most densely populated in the world. It is now experiencing rapid developments on the urban scale which have changed the skyline of the city. The "cementification" of its urban areas and the additional asphalted exteriors compared to the urban greening had led to a direct impact both on the ecological and on the wellbeing and comfort of city dwellers. This problematic situation can be related to the inadequate quantity of vegetation and green areas in the urban environment, which has also been demonstrated through research as fundamental for man's psychological wellbeing. The implementation of vegetation on building facades is also ecologically and aesthetically important for the improvement of the sustainability of the built environment as an adequate architectural feature that upgrades facades. Their exploitation leads to an energy conscious design approach that prevents densely populated urban areas,

such as Cairo, from transforming into a deteriorated natural environment and consequently has a crucial role in determining the real estate value of the urban area.[19]

Therefore, urgent action at national level is required while adaptive mechanisms are put in place to deal with those environmental consequences that are already unavoidable. Long term transformative actions, such as enhancement of urban infrastructure and public parks to render them less vulnerable to climate change, demographic transition, and new modes of urban farming are highly needed. These interventions require action by local or regional authorities responsible for the management of public landscape spaces, while other NGOs can enhance on an individual basis living roofs/walls and domestic gardens. The enhancement of green infrastructure and public and private parks (driven by government or landowners) also present greater potential for landscape co-ordination, as opposed to roofs/walls and gardens (driven by individuals or organisations). The potential need for a top-down (led by local/regional government) and a bottom-up (led by conservation citizenry) reconciliation efforts as shown in figure 2 is extremely important.[20]

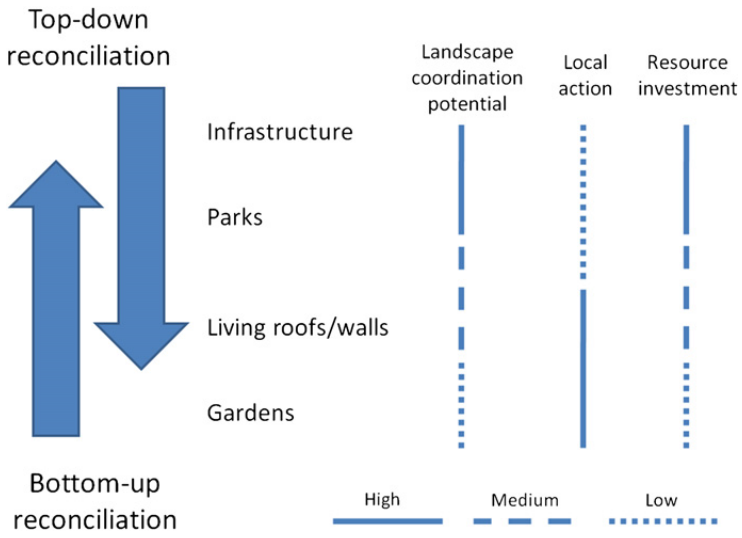

Figure 2. The potential for top-down (led by local/regional government) and bottom-up (led by conservation citizenry) reconciliation efforts.

USE OF LIVING WALLS IN EGYPT

Traditionally, green facades have been considered as the typical facades of buildings covered by vigorous climbing plants. Although it is a long progression, climbing plants could cover the facade of a building naturally. Unfortunately, this practice of urban greenery has been associated with damage to the building materials, animal attraction and maintenance costs. Recently, new attempts that allow greening the facades of buildings have evolved technically and conceptually with respect to the traditional ones. Considering the different building greenery products and systems that can be found in the market, we can already begin to establish different groups depending on how the greening of the facade of a building or construction is done. The living wall systems offered by several private sector companies in the Egyptian market had increase the variety of choice of plants that can be used beyond the use of climbing plants and offer much more creative potential. The plant choice in this case affects the aesthetical aspects of a greened façade. Some examples of such implementation in Egypt are shown in Figure 3.

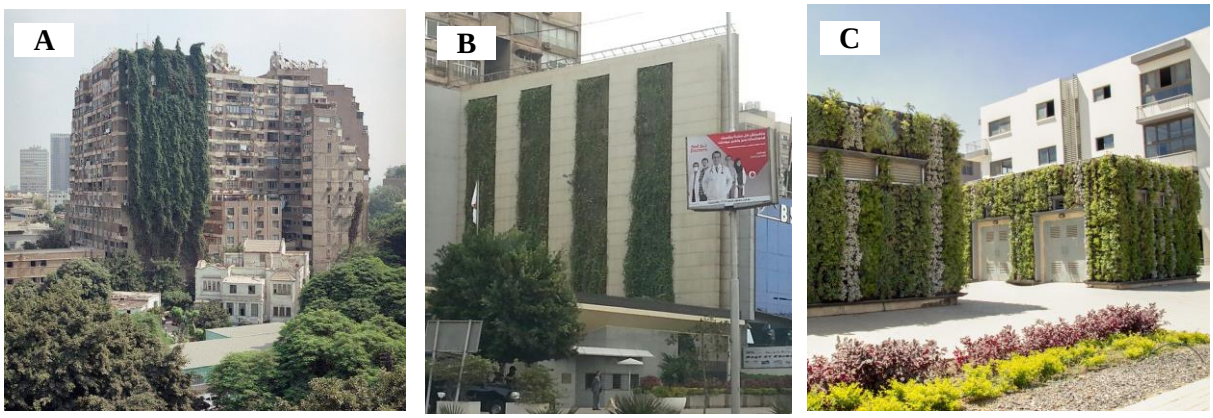

Figure 3. Example of figure
A) A traditional green facade in Cairo, using self-clinging climbers, rooted directly in the ground
B) A vertical support structure for climbing plants development, Japan Embassy in Cairo
C)An Indirect greening system in New Cairo, which include continuous and modular solutions[21]

The analysis of the most pertinent systems in the field of green wall systems demonstrates that there is a significant development in this field. Some examples either modular or continuous focus on its lightness, through the application of geotextile and polymeric materials. This can be very useful regarding the application of these systems in buildings recuperation.[22] Also the aesthetical aspects play a role inside the systems evaluation, since the use of façade vegetation could increase the building (and neighborhood) economical value.

Studies on the life cycle of some Living Walls Systems have shown that their sustainability may be questioned. Differences in the type of materials used, their durability, recycling potential, vegetation durability and water consumption can have an important impact on the total environmental weight. Respectively, each green wall system has its own characteristics, with advantages and disadvantages depending on their aesthetic potential, cost and maintenance needs. The selection of the most suitable system is directly related to the building characteristics (orientation, accessibility, height) and climatic conditions (sun, shade and wind exposure, rainfall). Therefore, it is important to understand their differences in composition and their main characteristics. [23]

A crescent number of modular Living Walls Systems emerged lately in the Egyptian market to minimize installation, maintenance and replacement problems. Yet, some unstudied application experienced damage due to the lack of maintenance (irrigation or nutrient) or design mistakes (choice of the wrong orientation of the façade or plant species) as shown in Figure 4.

It also important to analyze the durability of the systems, for example a panel of a Living Wall System based on felt layers has an average life expectancy of ten years, but the Living Wall System based on planter boxes is more durable (more than fifty years).[24]

Figure 4. Example of possible damages due to the lack of maintenance and to design mistakes of a Living Wall System based on flexible bags (felt layers) in Cairo:
A)At the beginning of the implementation B)After several months C)A cross section of the system

There is also interest in the possibility of growing food on living walls. Although there does not seem to be a commercial venture at this point, there are some international valuable proposals for 'Agro-Housing' projects planned in China, which proposes to create a vertical greenhouse where families can grow food close to their living quarters.[25] Recently, a number of NGOs and private civil entities were able to work with local residents in different communities in informal areas in Cairo in gardening projects on walls or rooftops and setting up trainings in hydroponic farming techniques. They aim to upgrade the economic level of the residents of such communities in Cairo while taking a small cut to supply their own actions and delivering their harvest to the market. Among these organizations working in Cairo district with informal areas residents is 'SHADUF' in Dar-Elsalam and Elbasatin areas.

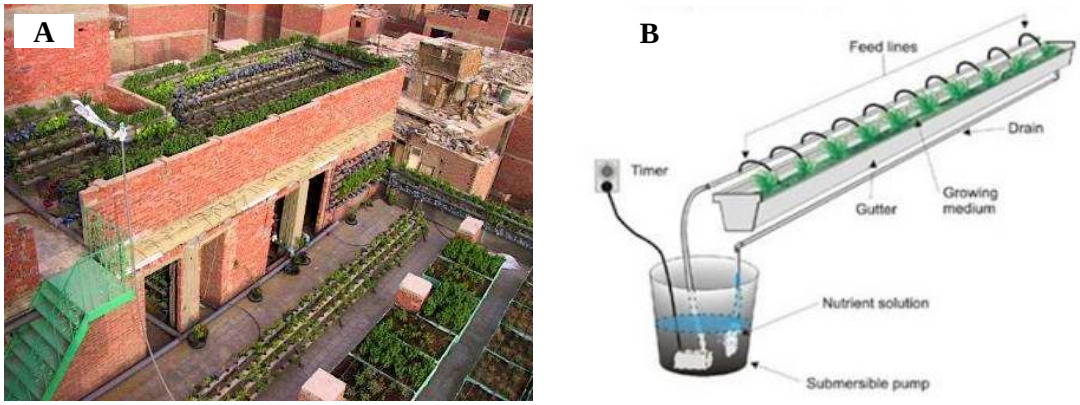

Figure 5. A) The use of Hydroponic Gardening horizontally and vertically in informal areas in Cairo
B) Hydroponic Gardening Illustration of a pipe system[26]

Shaduf's projects considerably help in increasing these Cairene's family income and creating a useful place for children to play. They provide families with a wall/rooftop farms that can be financed with a micro-loan simply paid off in a year. So far they have successfully installed and maintained more than 15 farms, intermittently checking the nutrient mix, controlling any pests organically, and collecting and selling their crops in local city center farmer's markets. They aim at creating 325 hydroponic gardens in Cairo in the near future

CONCLUDING REMARKS AND RECOMMENDATION

The main concerns of integrating greenery on building walls are to find new design strategies for a better performance and durability through the incorporation of water retention materials, drainage means and simpler assembly and maintenance processes. Considering the analysis of different types of green wall systems, it is clear that innovation is mostly focused on the improvement of their design to achieve a better performance, during the installation, usage or maintenance processes only.[27] The use of vegetation in the field of architecture design has also to be taken into account the designers' difficulty to see greening systems as building materials. It's true that green envelops are characterized by a sustainable aesthetic outcome, which is nowadays relevant for the market; but these systems are very different from the conventional construction materials able to look and perform strong and immutable, which is what many architects still look for. Greening systems are dynamic elements; those systems change aspect and performances in the course of time.[28]

Systems adaptability is still a field of development. New solutions must focus not only in the application in new buildings but also in the rehabilitation of existing buildings, introducing greening in historical areas.[29] Most systems are designed to be applied in the vertical plan, allowing, in some cases, their application in inclined plans with some restrictions. Therefore, green walls must evolve and adapt to different surface forms and inclinations (e.g., curved, vertical or horizontal surfaces), with the convenient adaptations.[30]

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DE-PAIR THE ART OF RE-PAIR AND DE-SIGN – TOWARDS AN INTERDISCIPLINARY UNDERSTANDING OF MAKING IN SOCIETY

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INTRODUCTION

"It would seem that mythological worlds have been built up only to be shattered again, and that new worlds were built from the fragments"
Franz Boas

Much effort has been spent on the understanding of sustainable strategies such as: innovation, recycling, and up-use. However, less effort has been spent on understanding Re-pair as a concept. Yet, how we cater for systems to be open for tinkering, fine-tuning, and Re-pair is crucial for creating resilient societies, and enable participatory and creative agencies. Re-pair is a wide concept and has been appropriated by several disciplines besides maintenance, such as: medicine (wounds and cells Re-pair); biology (environmental Re-pair); linguistics (dialogue Re-pair); Japanese art (Kintsugi). The paper examines how Re-pair as a philosophic, didactic, and pragmatic construct helps to design: objects, buildings, and communities – as a tool for understanding objects and society. How Re-pair is valued directly impacts how we~~;~~ reiteratively build ongoing meaning, view socio-technological sustainability, and navigate varying crises.
The crises outlined in the symposium call (dementia, sedentary lifestyles, traffic congestion, urban pollution, and poor design sanitary systems) all operate on ~~an~~ individual, communal, and systemic scales. Inherent in Re-pair is an intense focus on and care of details (part, individual, community, operational aspects) with keen understandings of systems (society, *LifePlace*). The research takes its energy, construct, and examples from a wide array of cases of field research at varying scales conducted by the authors:

- Comprehensive ethnographic global study of artist communities;
- Techno-social study of Brazilian favela;
- Interdisciplinary study toward crisis and resilience planning in the USA
- Diaspora communities (places of departure and the new intermix in the places of arrival)
- Slum and informal settlements from hygienic and sanitation needs
- Participatory engagement between agencies, community, and environmental service systems

These field studies are, true to the subject matter, interdisciplinarily collaged together to gain understandings of varying components, relations, and how they may be incorporated together in varying scenarios. The outcomes hope to build an ongoing database for continued work in these areas.

How do we see engagement?

As a foundation of this paper lays thesis that engagement on both individual levels and a communal levels are crucial in order to create resilient and sustainable societies—healthy societies—healthy cities. We are arguing that one way to foster increasing engagement is through acts of Re-pair. The research herein takes its energy and departure points from instances in various projects~~,~~ and case studies conducted by the authors. In this research, the authors found the concept of Re-pair as a common linchpin. The attempt of this paper is to establish a design philosophy, or discourse, based on potential trajectories of Re-pair. Very few if any contemporary thinkers are opposing the statement "*engagement is crucial in order to create…healthy societies"*. Indeed the problem with engagement runs as an interconnective thread in this conference. However, what seems to be debatable is how these engagements are achieved and what they constitute. More than often, we see the concept of engagement as a social political phenomenon; i.e. the level of engagement is measured how the individual and the community are listened to~~,~~ in decision-making processes. With a few exceptions, this political engagement seems to be in decline on the national level as well as a local. Since the 1980s, we have seen a decline in voter turnout[i] as well as an engagement in political parties and institution. However, the political engagement is just one of many forms engagement can take. On a more direct level, engagement can be seen as a mundane corporeal act; i.e. how do we engage with objects and spaces around us. One of the measurement of how this interaction is how much we are responsible and allowed to: tinker, fine-tune, alter, adapt, and/or Re-pair our surroundings—the measurement of reparability can be seen as a measurement of engagement. The trend here, unfortunately follows a similar trajectory as political engagements. We are allowed to touch and alter less and less of our surroundings; i.e. we, as individuals, are not allowed, to have the knowledge of, or the ability to Re-pair objects, entities, institutions, environments, systems or networks (to make better the components within our *LifePlace* along with our critical self(s) in correspondence). This is true in almost all scales we are observing. Due to legal, design and technical aspects we find our world more and more untouchable and unrepeatable. One example of this trend was the 2012 Apple MacBook Pro laptop. The product was simply physically put—glued, fused, fixed—together in a manner that made it unRe-pairable. Kyle Wiens, the co-founder of iFixit, deemed the MacBook: "Unfixable, Unhackable, [and] Untenable"[ii]. And the Cornell University researchers Steven Jackson and Laewoo Kang expressed it: "the construction of the new MacBook Pro was remarkably closed in nature"[iii]. This is not ~~a~~ unique to the MacBook. Many of our daily objects like cars, phones, blenders, and even cities have similar untouchable, unRe-pairable and closed designs.

So what do we mean when we say Re-pair? Commonly used, Re-pair is synonym to 'maintenance'. As such, the act of Re-pair is often understood as a necessarily evil, an act executed in order to keep up the function of a system. Consequently Re-pair is thus seen as an act that reduces and degenerates the function and/or value of the system. A car very seldom increases its value after a Re-pair. However, if we allow us to expand the definition we find a more generous understanding of what Re-pair constitutes. In an etymological sense, the term Re-pair is the amalgamation of the common prefix *Re- (again)* and the root –Pair. The latter stems from Latin's *parare (make ready, prepare, furnish, provide, arrange, order; contrive, design, intend, resolve; procure, acquire, obtain, get; buy, purchase).* Commonly, the –pair in Re-pair is perhaps most understood from the connotation of: *make-ready or prepare.* In the broader context of our discourse we can, therefore, understand Re-pair as the act of *making ready again (and perhaps to find 'parity' with current conditions).* Subsequently, the concept of Re-pair constitutes an activation (referred by the term make ready) of an existing object, entity, institution, system or network (referred by the term again). In this definition the term Re-pair elevates above the connotation of maintenance and open up to a better understanding of how Re-pair and engagement are related.

The Artist Studio

The place is in a state of controlled chaos. A series of big two-story high industry windows on the north wall letting controlled light into the space. Opposite the windows the artist has constructed a mezzanine that hosts the more private functions of ~~a~~ life. Under the mezzanine is a storage area full of tools and materials. In a corner, a motorbike is laid out carefully laid out in its parts for maintenance. In another corner a sofa, chairs and a TV creates a living room. The two remaining windowless walls are full of paintings in different stages. On a table in the middle of the room, tubes of paint are carefully organized together with a series of objects that inspire~~s~~ the artist. This studio/living space belongs to the artist X who lives and practices in Brooklyn, New York. However, it could have belonged to any number of artists we met in our studies. X space shows similar characteristics that artist spaces contain, regardless if they were located in Brazil, South America, Colombia, Singapore, China, Sweden, the US, Bali, etc. In our pursuit to understand how artists select their living and working environments, we conducted over xxx interviews with artists worldwide. In these discussions about how to locate an art practice, a number of important factors that effected the decision came up. Proximity to production, allowance of slow and natural growth of the facility, good mix of private and communal spaces, flexible spaces, and autonomy, were some of the factors artist somewhat agreed to as important in creating a sustainable space and community to work in. Three of the factors indicate that the concept of re-pair, *(making ready again)* is crucial when understanding creative spaces:

- slow *growth*, the importance of sequential improvements;
- *flexibility*, how easily is it to change and re-arrange the space; and
- *autonomy*, allowances for change and repairing the space

In short, the more artists can engage in their space the more creative the space becomes. We find similar relationships between repair and engagement when we try to understand favela life in Brazil.

Tavares Bastos—Daily Practices of Social Re-pair

Behind me on the balcony comes the sound of loud live music, guitar, trumpet, drums and song, from the ongoing Maze Inn Jazz party. On the left, roughly ten meters to the side and perhaps ten meters below, a young man listens to loud rock and roll from his radio while he exercises with a home-made barbell system created from a car axel and pails of sand. Approximately the same distance to the right and slightly above is an elderly woman softly humming to herself as she waters plants on her veranda. Two stories below, at street level, another neighbor uses a loud electric saw as he works on his home. This is just one of many instances of daily life in the favela of Tavares Bastos. Communal social living within the favela flows in a constant state of very noisy Re-pair.

The geography and weather of Rio de Janeiro necessitate few windows and housing in the favela is crammed into every available nook and cranny. As a result, favela residents live in incredibly, and intensely, close proximity to one another. In many cases, they live literally above one another and most favela residences are separated by no more than ten or twenty meters. As such, they all hear the noises of the favela and these noises continue twenty-four hours a day. How do people live in such tightly crammed and constantly noisy quarters without killing one another? This is where we saw Re-pair of the community as part of daily social praxis and engagement. We watched as residents moved amongst the tight physical space of the favela like swarms of fish in the sea, close together, but never quite crashing into one another. We listened as residents chatted, laughed and occasionally argued, but the underlying theme of these interactions was one of acceptance, trust, and mutual understanding. If your neighbor's music is too loud you don't call the police or storm over to argue, you walk over to share a drink or go to bed with ear plugs. This ongoing social re-pair is interesting from a health perspective since we find correlations between mortality and social interaction. A study of the relationship that followed 308,849 individuals over a 7.5 years period indicates that, "individuals with adequate social relationships have a 50% greater likelihood of survival compared to those with poor or insufficient social relationships. The magnitude of this effect is comparable with quitting smoking and it

exceeds many well-known risk factors for mortality (e.g., obesity, physical inactivity)"[iv]. This shows that social architectural re-pair design strategies might directly affect aspects of physical, mental, and spiritual health.

Kibera Nairobi

The strategies of re-pair are a foundation to the work of the Centre for Disease Control (CDC) in the Kibera slum community of Nairobi, Kenya. This infamous slum is one of the largest in Africa. It has intrinsic problematic and unhealthy life conditions, economically as well as physically such as access to clean water and proper septic systems to remove disease ridden material. Preventative medicine and vaccinations can only marginally prolong life here; however it does not address the issues at fundamental levels. Much of the CDC's efforts are therefore focused on educating decision-makers and citizens on the impacts of community design on health and quality of life. It hopes to build community-based partnerships with design decision makers and their influencers in order to translate research into best practices. The community centred clinic, while performing necessary preventive medicine for its local inhabitants is also conducting vital research to identify links between healthy practices and community design.

The primary goals of this research are to foster participant oriented, community-driven upgrades (Re-pairs) to the living conditions, so that its participants can begin to act as a self-sustaining and productive community within its greater urban context. Since key problems were environmental in nature, the proposed strategic upgrades were primarily physical, built-environment clarifications aligned with the directives of the global partnerships of *Cities Alliance, UN-Habitat*, and the *Kenya Slum Upgrading Programme* (KENSUP), wherein is outlined multiple common tactics to uplift (Re-pair) communities in need. The list consists of key areas including: Poverty alleviation (Economic centers/community education/business incubators), Health and education (Community clinic facilities and health education capacities), Preservation of historic city /community centers (Social and community engagement), Environmental and sanitation improvement (Site repair, landscape and water quality), City-wide infrastructure and transportation expansion (Community access centers to economic capacities). From these ventures, community education and informed upgrades were paramount, enabling participants to alter their own conditions and quality of life.

Living with the Great Rivers - Flooding in Mississippi and Ohio Delta

Living close to the river was historically a prosperous strategy. The constant rise and fall of periodic flooding created fertile plains and varied animal, including human, adaptations of life in accordance. The lower Mississippi Delta, within America's 'Heartland' is birth place to unique forms of cultural life (Blues and Jazz music, southern Creole and soul-food cuisine, folk art, literature and architectural forms) well-known to the world. Today, mega-levee systems hold back the water creating waterways for movement of goods in a global economy. The general perception of the levee system as a protective system can be seen as a simulacra, a mere image of a working system that can be blown away at any time without given a voice to the effected populations. The system thus separates more localized natural systems and direct human interfaces. Flooding that use to be a tangible ~~a~~ local and repairable problem, has become intangible and global. Subsequently, the prosperity of the river has reversed. Today, it is well known that the closer people live to the great river, the quality of healthy life, access to education and economic prosperity, and life expectancies diminish. Landownership is~~:~~ restricted within varying operative codes, carrying increased insurance rates and dependent on effective development upstream, thus exacerbating the conditions of helplessness and disengagement in the face of crisis.

In the 2011 case study of the southern Illinois community of Olive Branch (ironically named after the proverbial branch carried by a dove after the Biblical flood of Noah's time), the people (roughly 800-1000 with over 200 structures spread over 10 square miles plus other adjacent communities, park areas, and levee buffer zones) were offered a governmental 'buy-out' of properties following the Bird's Point Levee expedited demolition (to save another place from flooding) and subsequent failing of local levees, wherein the

community would then be able to build anew on adjacent higher ground with the help of over 20 disciplinary experts from regional universities ranging from architects and planners to ecologists and business strategists. The goals of the participatory challenge were to rebuild new community facets in informed ways and to restore (Re-pair) large areas of land back to natural systems (to be made ready again) for flooding purposes as well as to serve as additional specialty farming and as buffers to natural park and conservation systems, thus correcting conditional facets for natural and cultural systems to prosper together.

The Park

So how would a design strategy that takes in repair as a consideration look like? Before we answer this, let us see how systems very easily become irreparable. Think of a park, a beautiful park. It brings greenery into a sterile urban landscape and oxygen into a polluted city. For citizens, it is place where they can go to, relax, congregate, play games, listen to music, etc. As such our park is a wonderful asset. It is the lung; it is the oasis; it is the retreat. This park is a generous space, it is open; it promotes engagement and happenings; and authorizes behaviors that are not usually observed elsewhere in the city: people having barbecues, friends playing football, groups playing music, people resting their dogs, people just sitting and contemplating, etc. And slowly it starts. There is bound to be some friction between the users of the park. There might be an incident where the music is too loud for someone. Maybe a football accidently knocks a barbeque over. Perhaps the scent of barbeque is irritating a man sitting contemplating. This results in complaints. Maybe a letter of complaint is sent to the director of the park. The simple solution on any of these problem is to punitively forbid the activity that causes the friction, resulting in the appearance of the 'No'-Sign: No-Barbeque, No-Dogs-in-the-Park, No-Football-on-the-Lawn, No Sitting-on-the-Lawn… in the beginning of this process the changes seem non-invasive. However, fast forward the timeline, the park, once an open, generous space, is turned into a closed system that caters very little for residents. The changes of the park have gradually diminished any engagement. In the final version, it is almost only an image of a park (a simulacra). If we go back to the observation from Rio, it is easy to see how some of the problems of disengagement are integral to the design. Like object (MacBook), cities can be designed and built as unrepairable (thus made inaccessible for participatory engagement on many levels). The physical dwellings and offices in the planned, the lower lying flat areas in Rio (Asfalto) are both more physically and socially separated from one another than in the favela. Proximal separations run hand-in-hand with separations, or breaks, in human social connections and interactions. Furthermore, similar to the Park the inhabitants of Asfalto, outside their own apartment, are prohibited to *make anything ready again.* Thus, the ongoing Re-pair of social cracks found in the favela is absent here. Instead of trust between inhabitants, we find security systems: cameras, fences and gates (Foucault's dispositive surveillance system). The research team experience this mistrust firsthand when on numerous occasions were told: "not to film in the neighborhood". In contrast, under five years of interaction in Tavares Bastos, we were not asked that once. The mechanics of the Park can also be applied in the slum of Kibera. The complex political situation of, Kenya, Nairobi or Kibera makes it impossible to navigate this as solely a political process. If we nourish any hope for the slum, repair must come both from the individual communal level as well from the politicians.

Towards a Design of Repair

So how do we design with Re-pair in mind? If we accept that design is about creating complex systems, (regardless if we are discussing it at the level of objects, architecture, cities, or nations). We believe that the problem with diminishing engagement is not complexity in itself, it is when complexity becomes 'complicatedness', which is created when we don't understand systems that constantly flux. In these design strategies, Re-pair needs to operate three crucial aspects:

- *Continuum rather than Deadline*, systems need to be thought of as adaptable, changeable and adjustable over time. Inter- or even trans-operability must be accessible and continuative.

- *Openness, rather than Transparency*, if participants in a system are not allowed *to touch* the system, transparency is of no use. Open systems are always transparent; however, transparent systems are not necessarily open.
- *Proximity rather than Globality*, responsibility and engagement is better executed as direct relationships and participant interfaces.

In spite of the negative trends for engagement, there is actually some indication that we are going in the right direction. We start to see emerging systems that, albeit operate within large systems are open to the participants. New systems for wind and solar power put the emphasis on small participatory units connected to a large systems; the emergence of micro-brewery culture; and the Motorcycle producer Harley Davidson's success to create a community around a product that promotes Re-pair are all good examples of how the three aspects above have been implemented successfully in different scales.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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NECESSITY OF OPEN SPACE. SYSTEMS OF URBAN SUPERPOSITION AND POROSITY.

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In 1970, Henri Lefebvre began his book *The Urban Revolution*[i] with the following hypothesis and starting point: "Society has been completely urbanized" and he anticipated the emergence of what he called "global city", proposing that urbanization had come to supplant to the industry as producer of space inside the history of the world. Currently, according to a UN report published in 2014[ii], over half of the world's population (54 per cent) lives in urban areas and by 2050, 66 per cent of the world's population is projected to be urban. This rural to urban migration changes people lifestyles, generally causing obesity and sedentariness, due to urban environments tend to discourage physical activity and promote unhealthy foods consumption. Physical activity is hampered by several urban factors including overcrowding, high volume of traffic, heavy use of motorized transportation, poor air quality and lack of safe public spaces and recreation/sports facilities. Therefore, one of the objectives of the WHO is to improve the health of urban citizen, identifying the need for green spaces as one of the six main problems in cities today. Also, a large part of the scientific literature of recent decades confirms the relationship between urban green spaces and improvements in health[iii].
The Industrial Revolution produced extraordinary growth in cities, transforming into dark and somber places where the nature seemed to have disappeared, as Dickens' descriptions of English cities reflect. For example, *Hard Times* pass in a fictional city, named Coketown, always gray, full of the same buildings of red bricks, dyed black by the smoke of the factories, which constantly were emitting endless smoke serpents that did not let sun rays reach inside the city, with a black canal and a stinking river of strange purple color, where nature had been excluded, while the air and the most deadly gases had been incorporated[iv]. Faced with these facts, the main solution against overcrowding and urban unhealthiness has been recurrently the return to life in the countryside or to build the so-called garden cities, which became the basis for the nineteenth-century utopias of urban transformation as the Rurisville of Ebenezer Howard that he described in his book *Tomorrow: A Peaceful Path to Real Reform*, published in 1898 and which is the basis for building in 1903 the first garden city conceived as such, Lecthworth in Hertfordshire[v]; the Fourier´s *Phalanstère*[vi] or the *Familistère*[vii] of Jean Batiste Godin.

Fig. 1 Slums of London. Gustave Doré, 1872.

Nowadays, these bucolic solutions have generated a greater problem than the one they were trying to solve. The world population continues to grow progressively, in number, a hundred million more people each year according to the data of the Population Division of the United Nations[viii], and in the complexity of the ways of life, and both facts generate an increase in the demands of land. This double process produces an important conflict, the need of land in front of its scarcity, due to we have a limited space on our planet that if in other times it seemed infinite and full of mysteries, today we perceive it as quite small. In fact our ecological footprint according to WWF it is already of 1.6 planets[ix]. The current numbers of the world population and future forecasts make it clear that the urban sprawl as oil slick cannot continue, because it produces a large consumption of territory, as well as causes lack of intensity in urban life, by breaking down the city in different uniform areas for the different actions carried out in it.

The theoretical return to the countryside, fleeing from the city, sought as a solution to improve the quality of life, has led to the destruction of urban peripheral areas, where pre-existing agricultural or natural space has been replaced by low-density urbanizations that have erased that landscape that were longed for to be turned it into a new city, more homogeneous, dismembered and arid than that one of which they intended to flee. A paradigmatic examples such as Sun City in Arizona show how these new peripheral urbanizations or "garden cities" are extensive shadows from a city more hostile than the one to which they sought to improve, where transport infrastructures and automobile are essential, a homogeneous city that requires a lot of displacements, increasing with them air pollution which in turn increases the prevalence of respiratory diseases, cardiovascular diseases and cancer cases. Although the physical complaints are not the only or the most important diseases, another negative influence on the health of these city models is due to the loss of community life, since the lack of social relations constitutes a risk to health similar to smoking[x]. The absence of life is so alarming that it is difficult to find someone walking through its streets, which may make us to think that it is not really a city but a simulacrum:

“A city, to be really one, must have a rhythm based on different types of movements, human, mechanical and natural. The first, paradoxically, is suppressed; the second, tyrannically, is accentuated, and the third is inadequately expressed”[xi]

Fig. 2 Sun city, Arizona. Alex MacLean, 2011.

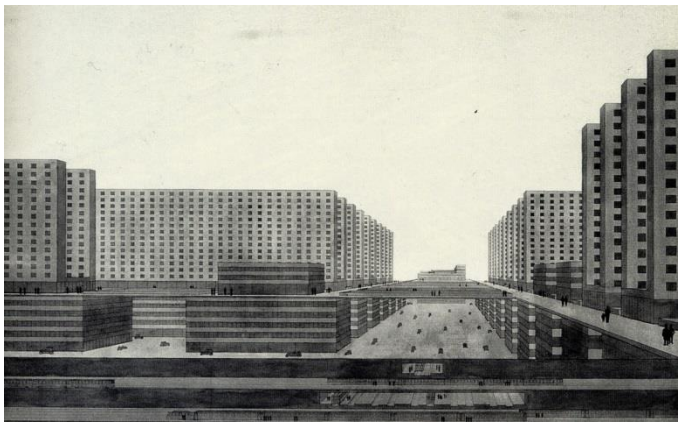
Faced with this process of spreading, we find the growth in height where the city multiply the floor plan folding on itself, instead of extending its surface it does so volumetrically generating density and intensity. Although the city can become unhealthy by an excess of density due to the scarcity of free space, and not only for the lack of sun or pure air, but also the humans are affected psychologically by claustrophobia and agoraphobia, two concepts apparently opposed but similar considering that both generate anxiety and restlessness due to an excess of urban density. The lack of free space can make us feel enclosed and also exposed to the crowds at the same time, and the individuals tend to feel instinctively affected from a certain point by the loss of ability to associate a surface with their environment[xii].

In ancient times, cities were identified facing territory. People lived in confined space, within clearly demarcated boundaries, where you knew your neighbors. You cannot identify boundaries of cities now. In the current pos-metropoli or city territory, people have been lost the feeling of identification and belonging. The aloneness produced by the disappearance of relationships and social ties, as well as the stress felt by living in an urban area, increases the risk by 39% of suffering a mental illness. In fact, the World Health Organization, points out the importance of these urban health problems, placing it as one of the most important elements to correct in the present cities and indicating the need to provide with green spaces to serve as elements of social interaction:

"Green spaces also are important to mental health. Having access to green spaces can reduce health inequalities, improve well-being, and aid in treatment of mental illness. Some analysis suggests that physical activity in a natural environment can help remedy mild depression and reduce physiological stress indicators"[xiii]

Fig. 3 Manhattan night. Vicent Laforet, 2015.

Nowadays, both population growth and increasing urbanization of society lead us to the need to create dense urban areas but eliminating unhealthy factors that up to now entails city life, we need to incorporate nature into the city in an innovative ways, for which new urban design fields must be explored by including concepts such as urban superposition and porosity, planning a 3D-city. It is also important that new urban mobility modes are incorporated by providing walking and cycling tours, in optimal safety conditions, both physical and environmental, and these new tours must be incorporated into urban green areas, responding to another of the requirements of WHO:
"Urban parks and gardens play a critical role in cooling cities, and also provide safe routes for walking and cycling for transport purposes as well as sites for physical activity, social interaction and for recreation. Recent estimates show that physical inactivity, linked to poor walkability and lack of access to recreational areas, accounts for 3.3% of global deaths"[xiv].
In the history of architecture, research on urban superposition have to date not gone beyond theoretical design and small examples, leaving only utopian images of designs that have explored urban thickness and section as fundamental dimensions of city. We can remember, among them, Vertical City of Hilberseimer, published in 1927 that planned different levels for the circulation of private vehicles, public transport and people, so could move about that utopian city freely and without danger; and the exhibition "Futurama", made in 1939 by General Motors in New York, where you could visit a large model of a theoretical city where people and cars on different heights, in a similar way to Hilberseimer design. In 1957, Alison and Peter Smithson also investigate this possibility in the "Berlin Hauptstadt" competition, announced in the context of the IBA'57 to reconstruction the center of Berlin as a single city and the capital of one hypothetical reunified Germany, perhaps the Smithsons´ made an innovative solution by this theoretical starting point. They designed two superimposed cities: a lower one where are the existing city and cars-road; and another one, a causeway for pedestrians to which they allocate a new experimental area, both spaces are connected by buildings and escalators: "Theirs design for streets in the air in Berlin Hauptstadt seemed to invite us to do more than move. The street, once freed of any other functions planned, was presented as the receptacle space of all those actions that were not classifiable within the programs of use of urban plans and returned to the city that capacity to be lived for instants. The spontaneous, mixed and overlapped use that was found in the public spaces of the unplanned rural towns"[xv]



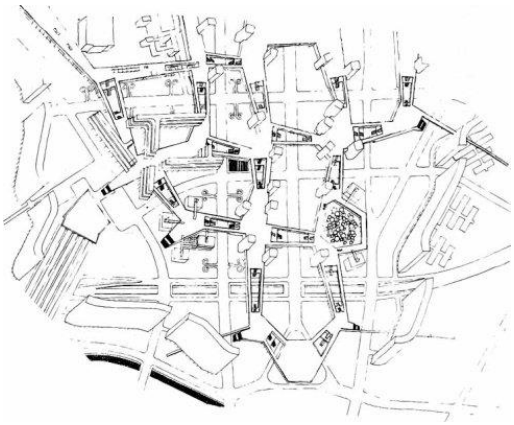


Fig. 4 Vertical City. Ludwing Hilberseimer, 1927.
Fig. 5 "Berlin Hauptstadt" competition. Alison & Peter Smithson, 1957.

Recently, in 2011 the architectural studio formed by Diller Scofidio and Renfro have reused the abandoned railroad of an elevated train in New York as a pedestrian promenade, known as High Line or High Line Park. It has been resounding success, becoming one of the new icons of the city. In the design, the steel of the old railroads has been transformed into green space and you can walk through, without cars, traffic noise or smoke, recovering in this way a space of high quality for its inhabitants without increasing the consumption of land. This experience has served to reflect on how much abandoned space exists in a city and how can be incorporated to improve the daily life of its inhabitants, without making additional occupations of virgin land. A lot of them are in front of us, so we just have to stop and look at to discover them.

Faced with these examples of 3D complex structures, cities have usually been returned dense by increasing the number of floors of their buildings, usually with only one function (offices, homes, hotels), on a previous urbanisation of streets that have not been modified in its thickness. In many cases the same grid that gave support to the city of the eighteenth or nineteenth century has continued as the base of the city of the twentieth, replacing only their built. This has generated a claustrophobic habitat where our gaze rarely finds a different view to a building similar to the one that we inhabit.

Free spaces, urban green areas and parks have been traditionally come up with as more or less large and marginal islands, reenactments of nature linked to leisure and free time. They are usually planned according to normative parameters that determine a number of green square meters per square meters of buildings constructed, without analyzing in depth their connection and intersection with daily life. The result of this planning system is that people have to go to park when, perhaps, it would be reasonable to live in it or walk through it as part of our daily life, so we would obtain a greater benefit deriving from its healthy conditions. In this connection, we should imagine other possibilities that allow us to develop better connection between built-up areas and green areas in city. We understand that the dense and compact modern cities need small empty parts, pores to breathe through, so their inhabitants do not suffocate in a sea of asphalt and concrete.

In 2009, the Italian architect Stefano Boeri designed two residential towers in Milan known as "Il bosco verticale", in which 10,000 m² of vegetation was developed on its facades. The buildings included the green surface of a large park unfolded by all its floors, in this way a direct relationship of plant elements with its inhabitants is established, although its use is mainly private. The improved of environmental capacity of these buildings has meant that their author had been called to build another vertical forests in different countries of the world, especially in China, with works for the cities of Nanchino, Shijiazhuang, Lishui, Guizhou, Shanghai and Chongqing and also the design of one forest city named Liuzhou, in which green space will be the main and integrating element of over city[xvi].

Fig. 7 "Il Bosco Verticale", Milán. Stefano Boeri, 2009.

Perhaps all architectural design that we have reviewed are concentrated in the theoretical section drawn by Alison and Peter Smithson for Golden Lane´s competition in which a residential building leaves green free-spaces every two floors. This structure suggests the possibility of making the city more permeable, making small boreholes at different levels, a dispersion of green areas in 3D that would produce several benefits simultaneously: a greater sense of freedom by breaking the visual barrier of buildings which are the landscape in most of peripheral neighborhoods in ours cities; an environmental improvement because of being able to multiply the urban green surface; and a greater link between citizen and free spaces that would no longer be isolated in specific areas, but dispersed throughout the city. This new way of built green areas would improve the relation of the citizens with free spaces and consequently their physical and mental health. This new way of conceiving the urban space would improve the relation of the citizens with the free spaces and, consequently, their physical and mental health because the distance from the places of residence to the green areas also influences, as shown in the study carried out by Sturm et al. in 2014[xvii], it states that individuals who lived 400 meters or less from a park had the most positive mental health status. These urban green micro-spaces, which multiply and put it closer the available free space, would also allow the introduction of small vegetable patch, substantially increasing their health benefits, since their use involves more physical activity and better food for their users, opening another important field of health improvement based on the quality of the products we eat.

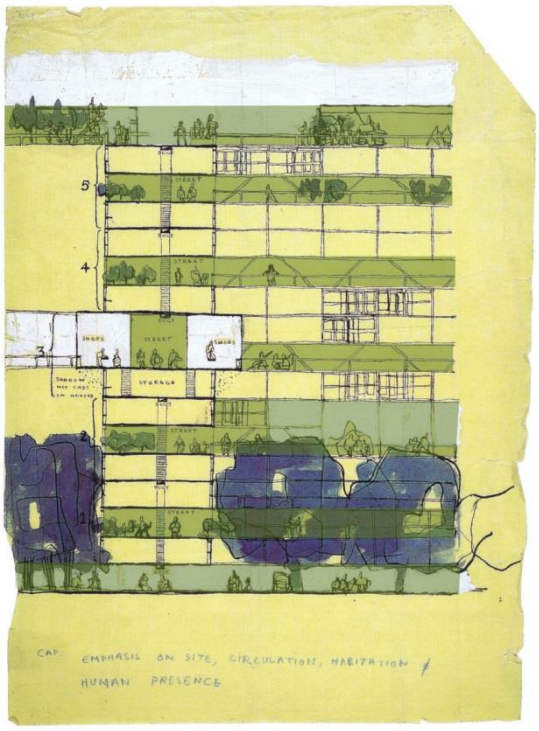


Fig. 8 Golden Lane´s sketch of section, Alison & Peter Smithson, 1952.

Along with the encourage of search and creation of green micro-spaces, when planning the city we should also quantify the distances that inhabitants go each day and generate areas of influence in which citizens can go walking or riding to the greater number of their habitual activities, increasing in this way naturally the daily physical activity and avoiding movements on motor vehicles. The establishment of pedestrian and cycling routes in the city should be a priority because of the high benefits it can bring, both to the individual who decides to change their habits and to society as a whole, by lowering CO2 emissions and sanitary costs. From architecture, these routes should be encouraged by making spaces more comfortable to circulate, by linking them with green spaces. Roads and free areas are benefited by conjunction of both urban functions, encouraging their use and both become more visible and accessible to every citizen in this way.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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IMAGINE, DESIGN AND MANAGE THE MIDSIZED CITIES THAT MUST CHANGE FOR THE CITIZEN WELL-BEING

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Today, the city is an extremely variegated habitat, in terms of size and type. It is, therefore, necessary to identify the territory to validate all the considerations carried out. In this essay we deal with problems of a city in the south of Italy, of about sixty thousand inhabitants, that we can define a midsize city. A city that is certainly an important model in the Apulian region, especially in its central part. A model that distinguishes the larger cities of the entire Italian South and, maybe, even of the northern area. Everything that will be said here also applies to those Italian urban centres of more than 40.000 inhabitants and, taking into account the due differences, also the European urban texture of equal size. Therefore, we deal with midsize European cities, not with big capital cities or small spread towns.

Around the 14th century, most of the midsize European cities are compact centres enclosed in high walls fortified with entrance doors. The average extension of these cities is variable and is included in a range between 5 and 20 hectares. The texture is dense and structured with a predominance of buildings rather than the street network which has very narrow and deep sections and where solar irradiation is very reduced. Green areas inside the walls are almost non-existent. Outside the defensive walls we find only countryside and nature.

As the 19th century approaches, urban centres renounced to their insurmoutablility and expanded outside the walls with compact buildings aligned following an orthogonal road net structure. In this network, some blocks made room to gardens and parks. Cities doubled, more or less, their surface. Streets[1], in this period, were wide and characterized by a promiscuous traffic of pedestrians, towings and carriages. Although the automotive industry progressed with the settlements of the great capitals, in midsize cities the car will still be a solitary appearance for many decades.

Over the past century, the uncontrolled expansion of cities, even midsize ones, led to a surface occupation approximately five times bigger than the ancient and the 19th century cities[2]. The population raised dramatically. The wealthier classes occupied the most central parts of the city and the historical section was clogged with constructions which eliminate almost all the green areas. The lower classes lived in the spread suburbs without services. The number of cars came to almost equate that of the inhabitants and 19th century streets were occupied by lanes and parking areas. Pedestrians areas were limited to narrow footpaths. The rate of air pollution exploded. The fine dust in the air blackened everything. Whether walking or by bike, going out involved a high risk to get lung diseases. Today, the midsize city suffers from chronic syndromes which, in some cases, lead to a quick incontrovertible worsening.

As an example, through a specific analysis performed on the city of Bitonto, we try to recognize the main problems considered repeatable in similar urban contexts, with evident territorial variations.

Cities face the abandonment and decay of ancient textures which now have two faces of the same coin. The first is represented by requalified and repopulated *piazze* by restaurants and shops. The second shows the decay caused by abandoned buildings. These two realities often co-live, with higher occurrence in larger cities and that usually distinguish the 19th century urban centres' boroughs. Also the 20th century buildings, which cover a far more extensive area, are characterised by structural and energy inadequacy. Thousands of cubic meters built with a reinforced concrete structure are marked by two main problems: low energy output and a bad heat retain. This leads to extremely high energy consumptions used for air-conditioning. In addition, these buildings are unsafe, inadequate to bear the effects of an earthquake[3].

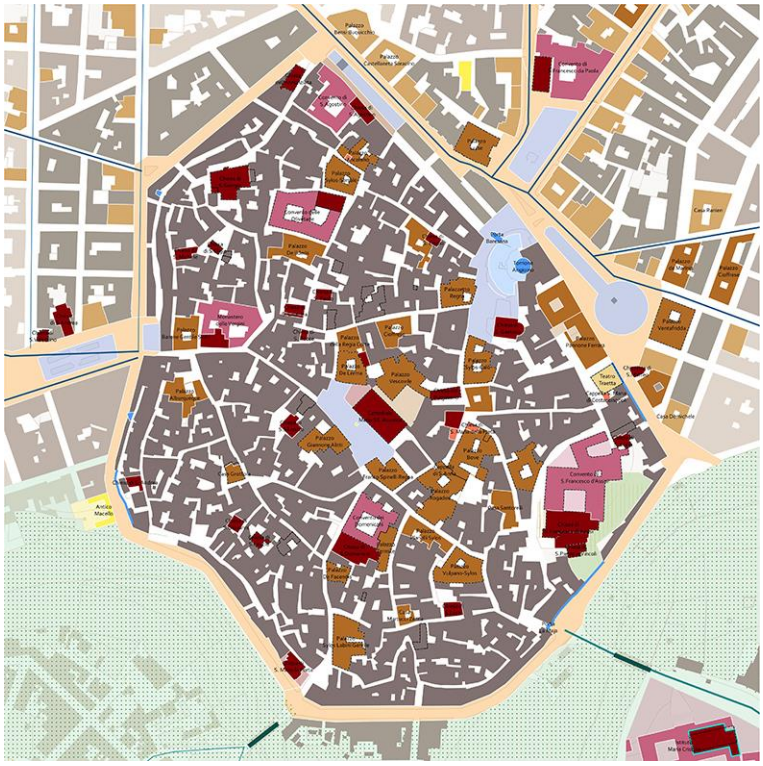

Figure 1. Plan of the Old City of Bitonto. Italy © DPP Bitonto

Even the empty spaces of the city show important critical issues. The continuous estate speculative thrust, which has supported the construction industry for decades, has slowly filled the city, occupying all the spaces. Besides some green spaces, parks and treed squares, all dating back the 19th century, almost all the space is marked by buildings. The equilibrium between fulls and empties, typical feature of a Mediterranean habitat, fails. The almost total absence of 'green', together with the high density of traffic into the heart of the city produce 'unliveable' conditions: a high degree of air pollution, harmful especially for those who decide to travel the city outside a passenger compartment; lack of places to stop and rest, mainly dedicated to the most vulnerable users; demolition of the aesthetic quality of neighbourhoods.

Imagining that a city, damaged by so relevant problems, can have objectives referred to the digital agenda of *smartness* applied to urban environments, becomes an arduous exercise. Reading Calvino we understand how, already half century ago, literature imagined aspects of our contemporaneity that would have turned so real: *[...] not only the content of the most important world libraries, of the archives and museums, of the newspapers issues from every country is already in our perforated forms, but also a documentation ad hoc collected, person by person, place by place [...] What we are*

forced to build is a centralised memory of the human being [...][4]. The writer's words shock for their adherence to what is happening today, in the era we are living in. The potential of this approach is all implicit, for example, in the *Trash Track*[5] project, realised by the MIT's Senseable City Lab, where a team of researchers labelled electronically thousands of waste samples from the city of Seattle, to allow geolocation in the their disposal route. This allowed the mapping of the activity, highlighting its critical aspects in order to reorganize the waste cycle and make it more performing. It is not difficult to imagine how this approach can induce the improvement of all the aspects of human well-being in cities. A more capillary detection of air quality through sensors integrated into smartphones of people who move on foot or by bike may influence the creation of a dynamic map of the atmosphere that can detect and direct the movement of people in the city. If objectives so complex are with difficulties pursued and implemented in big metropolis, imagine how small cities can even approach to topics like these.

With reference to urban changes, the keywords today are: requalification, smart city, sustainability, soft mobility, renewable sourced. We hear these concepts every day, however, most midsize cities do not have financial means, administration structures and competences in order to tackle so radical themes. Transforming a city is always increasingly difficult. The progress of specialist disciplines, in the field of urban transformation, make interventions more complex to be projected and to be technically realised. The legislative system in this area becomes increasingly intricate and very little effective in optimizing the procedures. Investments, today, come almost entirely from direct and indirect European funds. Consequently, there is no longer a true planning of urban transformation works but, rather, an unlikely pursuit of the possibilities resulting from the funds programmed by the central European authorities and dedicated to specific themes. Nowadays, the recent evolutions of our 'democratic life' make all citizens possible interlocutors and 'commentators' of any phase and of any subject concerning a transformation, in advance or in progress, and this has a considerable influence on the construction of mass popular consensus. If we add that, in all likelihood, the mutation of our cities in the near future will assume radical features, compared to the already passed epochs in quality and quantity of transformations, wondering the project's role in all this assumes a decisive relevance. The obsession with the paradigm of the artist-author today is rampant and invades clearly also the discipline of architecture. An aspiring architect is initiated to the cult of originality since his early training years and the myth of the epic or Promethean architect is often a sought-after condition in many professionals of the field. In addition, the invasive procedure of ideas competition, the spread of amazing images produced by the big names of the world star system and the proliferation of communities dedicated to designers, where anyone tries and yanks to acquire a minimum of visibility, has now lowered a veil on the eyes of many that prevents them from understanding. What is the ratio between the countless projects designed and developed for the regeneration of our cities and the works that have truly been accomplished and implemented with success? So, what is the result of architecture in the real world? Perhaps, starting from these questions, we can grasp how the relationship of realism between an applied discipline as architecture, its specific field of action and the historical context, that must never miss, can be considered definitely blurred.

Whatever the reference point may be, a common denominator is given by the awareness that the management of the future, including urban transformations, must involve citizens and cannot be only a direct result of a project untied from a sharing experience. Citizens will be operating actors who will apply what many define active citizenship. Therefore, a widespread attitude as NIMBY - Not in My Back Yard, when people are asked to renounce their own wellness in favour of common infrastructures, such as an expressway, must be overturned by a new practice, *SIMBY* - Start in My Back Yard. This means to lead people of a community to develop a common interest, starting from the

public place right after our own door. Citizens must be led to share their active citizenship widespread in the whole city. This change will result from active citizenship promoted by supervised processes and activities that will focus on triggering factors, such as tax-related subsidies. The purpose is to make this approach a spontaneous habit, not constantly and unnaturally activated. Substantially, the hope is a general increase of the *smartness* in the community.

So, what is the alternative model to pseudo-participation? Perhaps the Fab City - a project started by the Institute for Advanced Architecture of Catalonia, the MIT Centre for Bit and Atoms and the Fab Foundation - in which citizens have the power to be the masters of their own destiny[6]. Otherwise, the model of *Maker City*, an interconnected city whereinstitutions - schools, libraries, museums, communities and production places - change to become more cooperative and act through innovation and citizens involvement[7]. What about the architect? How the role of who learns to shape things evolves? The professional will have a new role as facilitator and chaperon along the processes of city construction through the figure of the choral architect, as well as defined by Ratti: "*[...] to contradict the proverb stating that too many cooks ruin the broth. Many cooks, in fact, will benefit the cuisine art if led by a talented chef. Halfway between the authoritative voice of Le Corbusier, who marked an entire era, and the widespread chat of the Internet, a designer, rooted in a network of communities, will create harmonies. The architect will not be anonymous, but plural and compositional. His authorship will never be deleted but contextualised, penetrating into the warp of a relational textile. We'll find ourselves halfway between a top down and a bottom up process, and the energy of the latter will be channelled through the focused structure of the former. The accountability of the choral architect is less oriented towards the creation of object rather to an orchestration process*[8]" of a strategic frame that "*does not predict with precision a unique solution, but clarify the best solution when this stands out*[9]" as Alejandro Aravena stated in a FinnishSitra co-design laboratory. We realise that, perhaps, the co-design and co-generation processes of the change can truly make the difference in a technical and political action of city mutation. And all that can be done is to experiment processes of this kind, observing their perspectives and results in those European cities, which are today real open-air experimental laboratories, and trying to test local realities.

Figure 2. A picture of Coworking in Urban Center Bitonto

From a research point of view, we can analyse Bitonto's experience, a city of about sixty thousand citizens of the south of Italy where, around two years ago, an experiment was started. It aimed at a change of the city's phisical structure during the following years. Since June 2015 to June 2017 I've fulfilled the role of Assessor to Urban Policies.
The planning activity has been immediately assisted by a Urban Centre established and coordinated by the Department of Urban Policies. The Urban Centre started knowledge activities and paths aiming at an alternative data collection from different urban realities, their systematization and a consequent distribution of knowledge into the civil society through activities of various type. This *output* and *input* activity had two purposes: on the one hand, to animate a true cultural debate on the most important issues of urban development and, on the other hand, to increase the widespread knowledge of the city in order to mature that citizenship available to the active contribution in planning activities.
Therefore, a Urban Centre is a mirror of the contemporary city, a creative and renewable city in which the demand for culture and knowledge assumes the real role of productive engine of the development of the entire metropolitan area. The Urban Centre is, therefore, a multi-disciplinary structure that organizes activities necessary to understand the urban context of reference in all its aspects, involving not only the world of architecture, urban planning and territorial planning. The Urban Centre has assumed the function of Urban Laboratory, open to urban civil society, to co-promote the improvement of the living conditions of the inhabitants and the sustainable development of the city, thus bringing the culture of contemporaneity closer to the urban culture of the citizens. The city will create a sense of membership in order to overcome a sentiment of extraneousness related to contemporary society, intended to whom cross it, and to transmit proper knowledge to establish more synergic relations with the environment, intended to whom lives it. A structure like the Urban Centre has proved to be a valid incentive to educate citizens on sustainable development, an educational and informative vehicle to guarantee basic knowledge aimed at improving the environmental and ecological impact of the territory. Only revealing the fragility, which underpins the urban dynamics, triggers the cognitive process capable of feeding the sense of responsibility to the territory and its resources. The Urban Centre of Bitonto has been, and still is, animated by the Smart Young Minds, a group made up of students, undergraduates and young graduates who have chosen to get involved with their skills in a process of settlement and future relaunch of the city[10]. According to its co-participation, co-design and co-planning purpose, the Urban Center[11] has challenged all citizens who wanted to discuss the various topics and issues that revolve around the city. A personal, cultural and, especially, civic challenge for every citizen who has chosen to be involved in the active life of his community. In this respect, the Urban Centre has set up the instrument for thematic focus. Each focus discusses a different topic, in which the details of the topic, the active components of the working groups, the inherent time schedule and the access to the discussion forum are explained. The Urban Centre has sustained the activation of cognitive Focus, which promoted the dissemination of knowledge on different aspects of cities, villages and territory. In addition, it supported design focus that proposed preliminary studies of urban design.
It's been started, then, an intense collective work on the city that has seen a participation of multiple categories of actors to influence effectively on building a possible change. Among the most representative focus that can be listed as pilot cases there are mobility and the redevelopment of the production area.
A focus on redevelop the Industrial area, promoted and supported by the Industrial Area Committee and by the businesses of the area, led to the preparation of a Dossier in which nearly one hundred companies have asked to activate resources and procedures for a proposal of conversion of the entire area into a Productive Area Equipped Ecologically and Panoramically (Italian acronym A.P.P.E.A.),

following the guidelines of the Apulian regional Territorial and Panoramic Plan (Italian acronym P.P.T.R.) and implementing the Legislative Decree (Bassanini Law) n. 112 of 1998. The Dossier, transferred by the Department to the offices and supported by such an important mobilization of the business sector, has promoted rapid responses. After the assignment of the planning task and the delivery to the municipal Protocol, the Plan is now under validation by municipal technicians and by the community in order to arrive, in the coming months, to the City Council. Therefore, the city will likely be the first on the regional territory to activate an APPEA, also strengthened by the newly created FabLabPoliba Digital Manufacturing Centre, managed by the Polytechnic of Bari. Concrete actions promoted by the citizenship that truly impact on the future of the most important transformations.

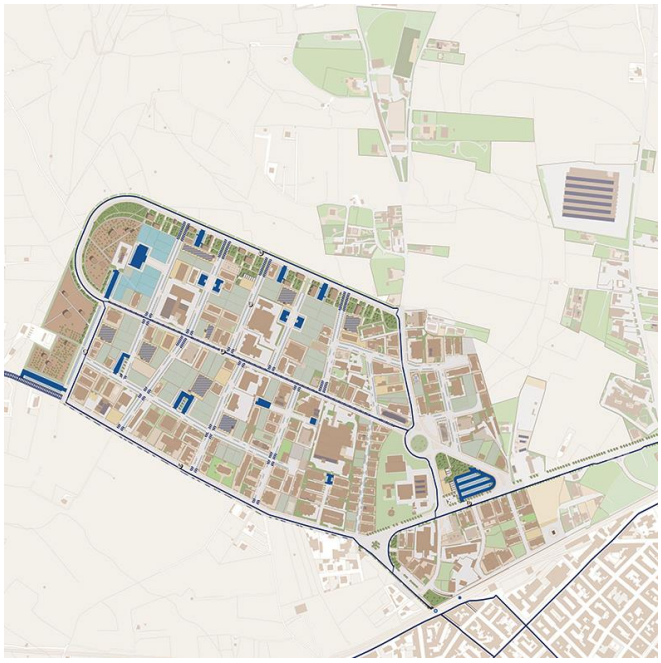

Figure 3. The Plan of A.P.P.E.A. in Bitonto © Atech

Figure 4. A vision of A.P.P.E.A. in Bitonto © Smart Lab

This is also valid for the drafting of the new Interim Plan for Sustainable Mobility in which, among the most important discussed ideas, there is the expansion of ZTL (limited traffic zones) in the central area that I considered as the theme of the year in the Architectural Design Laboratory during the second-year of the Architecture Degree Course. The working hypothesis included a new soft mobility that unloaded the main central axes, dating back the nineteenth century, eliminating the ground parking through underground infrastructure at the margins of chosen areas. It followed a redrawing draft of all 19th-century boulevards, along the Lama Balice and of the main squares, junction between the old town and the modern ones. The work, carried out with approximately fifty students, was shared with the engineering company that worked on the PUMS at that time. Hence, today the proposed Sustainable Urban Mobility Plan, has undertaken that idea and part of the topic - the one concerning the LungoLama - is even already financed with CIPE (Interministerial Committee for the Economic Planning) funds with more than seven million Euros.

Figure 5. Soft mobility and new urban spaces © Smart Lab

An achievement to be proud of that demonstrates how a so radical transformation, which greatly affects the health and well-being of citizens, cannot be started without the direct involvement of the entire community. Citizens, knowing the serious harm to health of a polluted city, promote active citizenship actions, which guide urban transformations and where professionals will be guided by citizens who become essential actors of this change.

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[3] The topic of the contemporary textile regeneration through the use of cement frame has been debated by the author in an investigation whose results are reported in the volume: AA.VV., *Renew Urban. Edifici ad energia positive nella rigenerazione delle periferie urbane*, ed. Nicola Parisi & Francesco Ruggiero (Bari: Arti Grafiche Favia, 2015).
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[11] During the work of the XXIX Congress of the National Institute of Town Planning, held in Cagliari in 2016, among the contributions, the Urban Centre of Bitonto was mentioned as the first for the innovation of the method for the creation of an active participation in the transformation of the city. All the work carried out by the Urban Center has been shown on a multimedia totem dedicated to the project at the Search of Cagliari.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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ADAPTING THE MAKER MOVEMENT IN A FOOD AND HEALTH DEVELOPMENT PROJECT FOR YOUNG PEOPLE

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INTRODUCTION

Public participation has become an important method of health development projects in Western countries. However, young people are often regarded as disengaged citizens, or as alienated from the traditional methods used by professional authorities in public participation projects[(1)]. In recent years, many researchers have been interested in public participation[(2;3;4;5;6;7)]. Despite the increasing focus, there is a lack of studies on the non-human actor: The effect of materiality on the process and outcome of an activity. A focus on the non-human actor might help us facilitate these projects.

The paper is based on a case study of the food and health development project called Food Maker, which is working with principles of public participation. The target group of Food Maker is young people. The Maker Movement has inspired the overall mindset of the project. What matters in the Maker Movement is that access to tools are given, as well as access to spaces, in which communities can be built.

By studying Food Maker, it becomes possible to look more deeply into how the inspiration from the Maker Movement is a new way of working with public participation, while working with young people.

Therefore, this paper will discuss the question: What significance does the space and materiality have, in practice, on the learning community in health-developing projects?

Public participation

The municipalities of Denmark have a responsibility to develop strategies that helps to improve the quality of life among citizens[8]. Different health development projects were initiated over the years. In the last 10 years, public participation has become an important element of governance (and municipal) projects[9]. However, the concept of participation is operationalized in different ways[10].

The municipalities are trying to set the arena for learning and for the development of life skills among different target groups. Working with the principles of participation, however, is not without challenges, especially when it comes to young participants. Young people do indeed form a group of disengaged citizens when it comes to participating in municipally based projects[11]. However, this should not be seen as a lack of interest in the projects, but rather as an alienation from the traditional way of being a part of these kinds of projects[12]. Young people are not accustomed or attracted to formal meeting procedures. They prefer to participate in looser and less hierarchical informal networks[13]. In tailoring participation projects to this group of citizens, it is important not to categorize

young people as a homogeneous group. Instead, authorities should design their projects to address and involve a more diverse group. Roger A. Hart has been working with different levels of participation among children and young citizens[14]. Hart emphasize that it should be a choice made by the young participant, how much he or she wats to be involved[15]. This also emphasize that the participants have a big influence on the project.

FOOD MAKER

Project Food Maker (initiated in 2015) is based in the municipality of Aarhus and is part of the local Public health department. The project is based on a broad and positive concept of health.

The target group in Food Maker is every young person between the ages of 16-28 years. The focus is directed towards the community and the joy of cooking while working with the principles of participation[16]. The young participants are the ones who teach each other about the joy of food. They do so by working together. In this way, the young-to-young (participants-to-participants) relation is playing a much more important role, than is the case in the expert-to-participants relationship often seen in health projects.

Even so, the employees at Food Maker still play an important role for the development of the project. In that regard, they are responsible for creating an arena for learning, which is attractive to young citizens, and which will make them want to participate, working together and learning from each other. Here the project had find inspiration in the Maker Movement.

THE MAKER MOVEMENT

The Maker Movement is a community of self-identified makers[17]. The movement can be traced back to its beginning in 2005[18]. Making is defined as: '*developing an idea and constructing it into some physical or digital form*'[19]. The Maker Movement is all about the process of going from thoughts to action. A maker is defined as someone who makes things with informal technology [20]. However, this article will only consider the ideology of learning, which is a big part of this movement.

The Maker Movement creates different kinds of workshops. These are meant to enable people to access and contribute freely to knowledge and developing their competence for personal and social growth through self-directed and collaborative projects[21]. Workshops play an important role in the learning process in the sense that they provide a space for people to work together and share implicit knowledge, to feel part of a community, to educate and support one another while allowing people opportunities for expressing their personal/individual values [22]. Even more so, the workshops help blur the boundaries between experts and non-experts[23].

Studies show that the participants' motives for participating change over time. Furthermore, these studies also show that the workshop format helps to sustain participant involvement[24]. The reason for this is that the workshops are constructed in such a way as to empower participants by allowing them to decide for themselves what they want to create. There is no standard set on what should be achieved during a workshop. The fundamental idea of making is that you learn that it is all about being in the process and letting your curiosity guide and develop you.

Learning in the Maker Movement

The participants decide what they want to do. New forms of access and training are emphasized and so are processes for learning and reflection[25]. It is important not to underestimate the significance of what people are doing in community workshops[26]. These kinds of workshops further the hands-on-learning experience[(27;28)]. The participants' involvement and engagement come from within driven by a mix of curiosity, enjoyment and

community. The workshops make it possible for the participants to acquire new skills, have fun, become frustrated and inspired in turn while at the same time, they gain recreational, developmental and socializing experience[29;30;31].

To cherish this kind of learning, you need a 'maker mindset'. Moreover, the Maker Movement may be a new phenomenon, but it is built on familiar leaning theories.

Studies have shown that one of the more important factors of learning in the Maker Movement, is 'sharing' in community[32]. To help understand the importance of community, many studies draw upon the concept of 'community of practice [33;34]. A community of practice is a group of people who work in a common domain and through their participation share knowledge and experience[35].

Even though the community is held up as the most important factor for learning in the movement, the practice of learning is also facilitated by materiality.

It is claimed that The Maker Movement has its theoretical roots in Seymour Papert's constructionism. Learning in this perspective draws upon constructivist thoughts. The difference is, however, that in constructivism, learning is based on active firsthand experience. Constructionism extends the theory of constructivism to focus explicitly on how the making of external artefacts supports learners' understanding of concepts. In a constructionist view, the artefact itself functions as an evolving representation of the learner's thinking[36;37].

METHODS

This research is undertaken, as a single case study[38], on the health development project Food Maker. The research goal is to look into the practice of Food Maker, and the material impact on practice, while working with and transforming the Maker mindset**.** Because of the interest of looking into practice, the methodological position is inspired by Practice theory[39;40;41].

The aim is to provide a deeper understanding of practice. Therefore, qualitative methods are used to collect the data, in this case methods such as participatory observation and semi structured interviews have been used.

In all, 20 observations have been conducted (in all 87 hours of observation) by participating in 20 different activities (workshops) by Food Maker. The aim was to look into the role of materiality in praxis.

Nine semi structured interviews, 60-110 min. of length, have been conducted (three boys, four girls and one professional). The interviews give insight into the young participants' experience of the practices.

EMPIRICAL FINDINGS

Observations are conducted at different Food Maker workshops. Only a few of the participants were professionally trained. Up to 24 persons can participate in one workshop. Strategically, the workshops are held in different kitchens. These are centrally located, as to make it easy for participants to access by public transport or bike. The workshops are held Monday – Thursday from 5pm to 8-9pm.

The focus of the workshops is on different themes: 'Risotto', 'Pasta' or 'Cakes' to mention a few. For every workshop, one or two young participants select the themes. They are also made hosts for the evening. The role of the host is to guide the other participants if needed. Often, the participants do not know each other beforehand. At the workshops, the participants split up into groups of 4-6 people. Often, there are different elements, which are put together to complete the menu. It is up to the participants, to decide who is in charge of the different elements of the menu.

Kitchen design

At one observation, we are in a kitchen, which is designed in a way so as to allow two groups to work at the same table. Each table contains two sets of hotplates and sinks. In this constellation, it is possible for the groups to work face to face but without getting in the way of each other. Furthermore, there is a table of vegetables, seeds, cheese, rice, oil, spices. The participants are free to use these. A girl in one of the groups is in charge of making a salad. She has chosen to use cabbage, lemon, feta, onion and apples. While chopping the ingredients, she is looking at the other group, sharing their table. A boy is standing at the hotplates with a pan full of sunflower seeds. The girl asks the boy what he has done to the sunflowers. He tells her he roasted them with salt. The girl asks him how? He explains that beside the sunflower seeds and salt he put in a bit of water, which evaporates due to the heat. The girl decides that she also wants to make salty sunflower seeds for her salad. Almost a year later, the girl is interviewed. She explains that she still makes the roasted sunflower seeds and is experimenting with different kinds of spices.

During an interview with another girl, it is pointed out, that one of the reasons she participates, is to get inspired to use her groceries in other ways. When she attends the workshops, she prefers cooking things she is familiar with. She explains that if the menu is something new and unfamiliar, she often takes an outsider role, for example by chopping familiar vegetables, just watching the other participants be more creative with the food. In spite of this, she explains that she learns a lot from participating, and has since made many of the other participants' dishes at home. Dishes she thinks she never would have come up with herself.

These empirical examples highlight the significance of the communication (intended and non-intended) between participants. Even more so, it emphasizes that the room can further communication. Some of these communications may not be intentional, or even verbal. What happens in these creative communities is that participants try to imitate each other in order to learn. The boy is improvising with sunflower seeds, and at the same time inspiring the girl to develop new cooking skills.

Other observations took place in kitchens which were designed with working tables placed alongside the walls. This means that the participants are working in their own kitchen, with their backs to the other groups. These observations, did not register the same interaction among participants. This leads us back to the interviewed girl, explaining that she learned a lot just from observing the other participants being creative. To facilitate this kind of interaction requires a kitchen, which is designed in such a way that she can work with the food and at the same time be facing the other participants.

Recipes

At the workshops, there are no rules for whether or not the participants should work with recipes. Some hosts have pre-printed recipes, others make guidelines on a black board. Some just present a theme and some groceries, and it is then up to the participants to be creative.

During the interviews, some of the participants expressed different perspectives on the concept of recipes. Even though all the interviewees claimed to have a great joy of cooking, their enjoyment was expressed differently. In this regard, materiality, in the form of a recipe, plays a big part.

One girl explains that she likes to participate in the workshops because she learns new ways to create dishes. This girl prefers to take part in workshops where recipes are used. She explains that this is because she then knows what to do. Even more so, she finds the recipes make it easier to communicate with other members. In some of the observations during the workshops, it is noticed that the group members use the recipes to decide who is to make what elements. However, it is also observed, that the group members sometimes follow the recipes very strictly.

In this way, they show a lot of reliance on the recipes which has sometimes resulted in them not tasting the food until after the cooking process.

A boy, who participates mainly because of the community of food making, explains that he finds it most fun to work with the food without any recipes. That way he feels that he becomes more creative. However, he also explains that to have fun with the freestyling part, and to learn from it, you need to have some level of skill. By this he meant that to be creative with food, you should need to have pre-knowledge of texture, taste, and other cooking skills. This statement emphasizes the girls point, of feeling more confident using the recipes. So even though the observations have shown that the recipes can dictate the way participants work with the food, the recipes still give some of the less experienced participants a necessary knowledge and thereby the confidence to go ahead and cook the food in the community.

DISCUSSION/CONCLUSION

If a public participation health development project, focusing on diversity of young citizens and food, wants to create and facilitate arenas for learning and the development of cooking skills, it seems that inspiration can be found in the Maker Movement.

Maker workshops create spaces for diverse groups of different interests, skills, and knowledge. When working with the objectives of the Maker Movement, professionals must create workshops, where, in this case, young participants decide for themselves what they want to do. The roles of the participants seem to be shifting, which means there is a flexible structure to how work, learning, and teaching happens. To create this it is important, that the workshops be facilitated so as to create a space where participants are able to switch from the role of expert to that of a novice and vice versa. In this way, the sharing is not always a type of formal learning. Rather, it can happen unintendedly while cooking sunflower seeds for example.

Learning from sharing and working with different materialities, however, does not just happen. There is a need for facilitation. Here, the room and other artefacts can help the process along. As a facilitator of a workshop, you should not only see materiality as something with which the participants are learning. Materials also becomes facilitating tools. Not only do you need to give access to materials, you also have to make them visible. Some of the participants need guidance and direction in the form of recipes to be able to cook and/or participate in group work. Others want to make their own decisions and want to work without recipes. These more experienced participants, however, still need materiality to be visible. When they perceive the foods, colors, spices and equipment, they are inspired to be creative. Even more so, it seems beneficial if these workshops are held in kitchens, where it is possible for the participants to work face to face. In this way, the sharing part (intentional/non-intentional; verbal/non-verbal) works better in practice.

Over all, it seems as if working with the values of the Maker Movement, it seems beneficial to use the materiality and spaces as helping tools for facilitating. However, it should be noted, that the goal of developing the skills of the young participants, is the agenda of the project. But working with public participation means that the participants should also have a say in planning the project. This means that if the participants do not have any interest in developing their skills, but instead are part of the project for some other reason, the project should perhaps find its values elsewhere and not in the Maker Movement.

However, it still seems relevant to look at the materiality and spaces as co-facilitators[42]. It looks like these non-human actors have a great impact on the way the participant can participate, and in this way, they have a say in the project's issues and goals. While this study does not offer a conclusive answer, it would be fruitful to pursue further research about the impact of materiality in other health development projects.

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INTERSECTIONS BETWEEN ENERGY EFFICIENT HOME IMPROVEMENTS AND HEALTH: AN OWNER-OCCUPIER'S PERSPECTIVE

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INTRODUCTION

The impact of energy efficient housing interventions on occupant health, both positive[1,2,3] and negative[4,5,6], is well documented, both in the evaluation of programs such as Decent Homes[7] and Warm Front[8], and in clinical studies[9]. In light of the UK's legally binding target to reduce carbon dioxide emissions by 80% by the year 2050[10], there is a desire to increase the number of energy efficient domestic retrofits, making understanding the relationship between these home improvements and occupant health imperative. This paper will discuss the limitations of the existing research in this field, before demonstrating through empirical research that intersections between health and domestic energy use can be viewed amongst an alternative population of householders, and within a broader, non-linear constellation of practices. To conclude, the implications of these findings for simultaneously reducing domestic carbon dioxide emissions and improving occupant health will be discussed.

RESEARCH CONTEXT

Whilst there is a plethora of research investigating the relationship between energy efficient housing interventions and occupants, much of this research is subject to a number of limitations:

- The use of a narrow definition of health;
- An assumed linear relationship between home improvements and impacts on health;
- A focus only on vulnerable and low-income households.

The World Health Organisation (WHO) defines health as "*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*"[11]. However, whilst some attention has been given to mental health and wellbeing, future-proofing and safety, as shown in the summary of existing studies in Table 1, the majority of research around the health impacts of low carbon retrofit measures has focussed on issues of Indoor Air Quality and thermal comfort.

Table 1: Summary of existing research on health impacts of low carbon home improvements

Health Aspect	Impact
Indoor Air Quality	**Positive Impacts**
	Reduction in outdoor pollutants.[12]
	Reduction in common colds and chronic conditions due to increased air temperature.[13,14,15,16,17]
	Reduction in respiratory symptoms associated with mould growth.[18]
	Negative Impacts
	Increase in Indoor Pollutants.[19,20,21,22]
	Risk of overheating and heat stress/hyperthermia associated with increased air temperatures.[23,24]
Comfort	**Positive Impacts**
	Increased thermal comfort leading to improved mental and physical health.[25,26]
	Improved nutrition due to more comfortable kitchens to cook in.[27]
	Increased thermal comfort leading use of more rooms and associated benefits of less overcrowding.[28,29]
	Improved acoustic comfort due to reduction in external noise.[30,31]
	Negative Impacts
	Sense of isolation due to reduction in external noise.[32]
	Increased acoustic discomfort due to noise from plant (e.g. ventilators, heating systems).[33]
Future-proofing	**Positive Impacts**
	Reduction in maintenance tasks.[34,35]
	Improved access in the case of reduced mobility.[36]
Mental Health and Wellbeing	**Positive Impacts**
	Reduced stress resulting from increased financial control.[37,38]
	Reduced stress resulting from increased physical security.[39]
	Reduction in common mental disorders.[40,41,42]
	Reduction in overcrowding leading to improved family relationships.[43,44]
	Increased personal wellbeing as a result of space to undertake hobbies.[45,46]
Safety	**Positive Impacts**
	Improved occupant perception of safety.[47,48]
	Negative Impacts
	Potential increased risk of fire associated with some technologies.[49]

This literature is also largely limited to the impacts of home improvements on occupant health, whilst the role that health concerns play in stimulating and influencing the process of home improvement has received relatively little explicit attention. Contrary to the linear relationship between the adoption of low carbon measures and their subsequent impacts on occupant health this implies, many studies have identified aspects of health such as comfort as key drivers for the installation of energy efficiency measures[50,51,52]. Beyond comfort, Risholt and Berker[53], UKERC[54], Fawcett and Killip[55] and Haines and Mitchell[56] identify improved quality of life and enjoyment of the renovation process[57] as drivers to owner-occupier retrofit. Despite these findings, there is little research examining how health concerns may not only *stimulate* home improvements but also influence *how* they are undertaken.

A final limitation of the existing research in this field is that many of those studies that adopt an explicit focus on health and wellbeing focus on low-income households[58,59,60] or vulnerable occupants such as the elderly, children, or those with chronic health conditions[61]. This focus is also reflected in policy interventions focussed on the health benefits of improved energy efficiency, such as the Decent Homes standard which focussed on thermal comfort, in addition to health and safety considerations, state of repair, and modernization; and Warm Front which was aimed at vulnerable owner-occupiers and private renters[62]. However, following these policy interventions, The Green Building Council reported a need to encourage the adoption of energy efficient measures beyond this limited population of vulnerable or less affluent households:

> *"We should not underestimate the scale of the challenge that remains ahead. Delivering even these simple measures was no small task despite them being relatively easy to install and incredibly cheap (or free) to households…We have to move away from these low-hanging fruit…and we need to do this on an unprecedented scale."*
> *(Richard Griffiths, Green Building Council, May 2013[63])*

However, programs such as the Green Deal (2013- 2015), which were designed to encourage the adoption of energy efficient home improvements amongst more affluent households[64], have had disappointing results[65], indicating a greater understanding of home improvements amongst this group is required.

RESEARCH METHODS

In contrast to existing research described above, this research will draw on 31 in depth, qualitative interviews and walk-through tours with owner-occupiers of average or above average affluence (based on Census 2011 data). These participants all own properties in the Henleaze, Bishopston and Redland wards, to the north of the City of Bristol. Having been Green Capital 2015 and a GreenDeal Pioneer city, the awareness of energy efficiency retrofit measures in Bristol is relatively high. This permits an investigation of why owner-occupiers may or may not have adopted retrofit measures despite these high levels of awareness. More specifically, the selected wards were chosen as a geographical sampling frame due to their combination of high levels of affluence and home ownership combined with poor levels of energy efficiency, indicating there is both a market for investing in energy efficient measures and the means to do so. Furthermore, the sample was balanced between young families and empty-nesters, rather than focussing on the elderly or the vulnerable. Finally, the sample also contained a relatively even number of those who had undertaken mainstream amenity renovations as well as low

energy efficiency retrofits to help discern if and how health-related practices were supported by different types of measures.

Adopting an inductive, interpretivist research philosophy, the interviews were designed to understand the home improvements from the perspective of the participants. Beginning with the home improvement measures adopted, participants were encouraged and to work backwards in time, 'unpacking' their home improvement projects. This approach allowed the researcher to understand the connections between adoption of these home improvement measures and the wider constellation of practices that made up participants' lives as described by Schatzki and Nicolini[66]. Therefore, even where participants may not have undertaken home improvements with the explicit intention of improving their health, material alterations supporting practices that help to maintain or improve health and wellbeing could still be identified.
Once transcribed, the interviews were then coded to identify the measures installed, the practices with which they were related and the nature of this relationship. For example, were they an impact of having installed the measure or had they been associated with the intention to adopt the measure? Furthermore, the data was analysed to differentiate whether participants described practices supporting occupant health as an ultimate influence on their home improvements, defined by Wilson as *"...explain(ing) why homeowners are deciding about renovating in the first place…"* or as a proximate influence that *"..act(s) on renovation intentions once formed..."*[67]. This analysis facilitated an understanding of when and how such practices influenced the adoption of home improvement measures.

RESULTS

During the interviews, participants revealed how their health-related practices had acted as ultimate and proximate influences on their home improvements. Many of the home improvement projects discussed by participants began as a response to part of the building fabric or services failing as previously reported by Wilson, Crane, and Chryssochoidis[68] . Such incidents most commonly included boilers breaking down or roofs beginning to leak.

> *"The roof had got to be redone, and I thought it you jack it up at and angle you've then got a nice sloping surface, facing roughly south, just right for putting solar PV panels on…"*
> *(Older Retrofitter)*

As also documented in the existing literature[69,70,71], comfort, most commonly in the form of increased warmth, was described by owner-occupiers both as an ultimate influence and an outcome of an energy efficient retrofit. However, this extended beyond the thermal comfort most commonly documented in existing studies, to also include increased natural light and space as well as opening up existing rooms to facilitate better social wellbeing through greater connection between the occupants of the property. As projects progressed, this sense of social wellbeing was expressed instead as a proximate influence on the desire to implement the home improvement in a way that would support the local community through selection of local tradesmen and suppliers, or by paying through a local currency.

"…we wanted to link up the spaces… and just feel like we're all living in one space…"
(Younger Renovator)

"It's important from the point of view of community or.... the local economy... I suppose that's what it is really. To make sure that money that you provide for goods and services is then circulated in your community. I mean it builds relationships within the community; it's not just about money."
(Older Retrofitter)

Furthermore, proximate influences on home improvements included existing or potential future health concerns. This included issues such as whether the conditions during the home improvements would be appropriate for participants to remain in the house or what might also be 'piggy-backed' onto current improvements to future-proof the home and make it adaptable to future health problems.

"So while it was going on, for a while we had a temporary kitchen in the middle room, but it got to the point where my son ended up having an asthma attack because of the dust levels were so bad, that we ended up having to move out…"
(Younger Renovator)

"So it's all set up for... well, if I'm an old lady and still living here then I can live downstairs. If I needed to sell the top as a flat, I could."
(Older Renovator)

This alternative population of owner-occupiers also revealed how concerns regarding health might manifest themselves differently in different households. These more affluent empty nesters shared a concern with issues such as increased warmth with their more vulnerable counterparts, who have been the focus of much existing research. However, beyond this concern with thermal comfort they were also interested in other aspects of comfort such as natural light, which have received far less attention in previous research.

" I'm working full time so I don't have a lot of time at the moment, but my plan is when I've got more time, I will do more sewing. So I've got to the age where I need, nice natural light to do that..."
(Older Retrofitter)

Beyond issues of comfort, these empty nesters were also concerned with issues of social wellbeing and future proofing their homes against a potential decline in health as described above. Meanwhile, younger families, who except where in fuel poverty, have not been the subject of many studies regarding the impact of home improvements on health, were more focussed on accommodating their changing family. This included opening up their properties to create a stronger sense of connection between members of the household as described above, as well embarking on loft conversions or extensions to provide additional bedrooms.

"…it (loft conversion) was done to house the kids basically."
(Younger Renovator)

Finally, this inductive, participant-led approach revealed how the house served as a point spatial intersection (as previously described by Blue and Spurling[72]) between health related practices that might take place outside of the home itself, and might therefore not normally be associated with home improvements. For example, young families described how they were undertaking home improvements in order to adapt a house they had bought primarily because of its proximity to a good quality state school, to their needs. This would indicate that something as apparently unconnected as the geographical catchment areas used to allocate pupils to state schools, is influencing material alterations to private homes. Similarly, participants of all ages described how hobbies and leisure activities had influenced their home improvements throughout the process. This was often in the form of sports that had a direct impact on physical health, leading to the adoption of additional showering or bathing facilities and an upgraded central heating system to match.

"…then the downstairs toilet kind of grew to downstairs toilet/wet room… if we come back from cycling or diving or whatever, we can shower off down here."
(Young Renovator)

"…there's a high chance that more than one person is going to be having a shower at the same time when you have quite few bathrooms… and the combi-boiler didn't allow for that. As soon as one person was taking a shower, if one person turned on a tap you'd get a cold shower, or water stops or whatever."
(Young Retrofitter)

DISCUSSION AND CONCLUSION

Using an inductive, interpretivist research philosophy, based on 31 in depth interviews, this research has revealed that health concerns intersect with owner-occupiers' home improvements beyond the niche group of vulnerable and low-income households on which many studies focus. For example, older owner-occupiers in the study may be encouraged to adopt low carbon retrofit measures in order to improve their environmental comfort, including not only higher temperatures as previously reported, but also more natural light, to facilitate long-term enjoyment of hobbies and leisure activities. Particularly once they are retired and likely to be spending more time at home. Meanwhile, younger participants were more likely to incorporate measures to improve the internal environment and create a larger area of comfortable, usable space, in order to make space for an expanding family without resorting to a costly major extension project.

Furthermore, whilst some of these concerns acted as a stimulus, or ultimate influence on home improvement projects, others only came into play as a proximate influence, once the home improvement was already underway. These included concerns regarding acoustic comfort, causing the installation of high performance glazing, insulation and air-tightness to be prioritised, or looking to access local skills and advice regarding the implementation of home improvements as a way of improving social cohesion and the local economy. The timing of these influences is likely to be dependent on both the household in question and the home

improvements under consideration, but this does indicate that these health-related proximate influences could encourage owner-occupiers to 'piggyback' energy efficiency measures onto pre-existing home improvement projects.

Conceptualising the dwelling as a spatial intersection in a wider constellation of health-related practices, and home improvements as material alterations to the home desired to support these practices, also suggests new ways in which the adoption of energy efficiency measures can be encouraged. For example, with the importance attached by young families to obtaining a good education for their children giving rise to many home improvements, the additional benefits that a more comfortable home can have for educational attainment could also encourage these families to adopt some energy efficiency measures. Sports clubs and leisure facilities could be a good place to advise on alternative forms of heating systems and water efficient appliances, as visitors to these locations may already be considering making associated improvements, such as additional bathing facilities and upgrades to their heating system.

Pioneering projects such as a recent experiment in Sunderland, where energy efficient improvements were prescribed on the NHS to patients suffering from chronic illnesses[73] , have adopted a more integrated approach to health and energy efficient housing in the UK. The results of this research suggest that health remains a concern amongst more affluent households, although it may manifest itself differently due to increased means. Therefore, a more integrated approach could have both health and energy efficiency benefits across larger section of the population than just those on low incomes or with chronic health conditions. As well as some of the specific opportunities for encouraging adoption of energy efficiency measures highlighted above, advice on the relative health benefits of different home improvement measures could also be available in waiting rooms at GP surgeries or other healthcare facilities. This would imply a shift from a clinical treatment based approach to a more preventative approach addressing the material constraints within our homes that fail to support health-related practices. With a recent evaluation of the Decent Homes program calculating savings to the NHS due to improved occupant health, to be £392 million, this preventative approach could simultaneously have significant financial benefits as well as benefits to occupants' health and reduced carbon dioxide emissions.

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WATER SENSITIVE URBAN DESIGN: IMPROVING THE QUALITY OF LIFE IN ARID AND SEMI-ARID COMMUNITIES

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INTRODUCTION

Water is the main source of living for humanity. It is expected that up to 50% of the global population will suffer water stress by the year 2030.[1] Arid developing countries are facing water shortage and pollution.

The number of people living in cities has increased from 13% in 1900, to 49% in 2005. The fast rate of urbanization affects the environment negatively causing poor quality of life, if not sustainably planned for. Due to the mishandling of water resources, developments now face challenges of water pollution, floods and water shortage. Thus, cities should be planned with consideration to the water cycle.[2]

Sustainable water management can promote techniques that provide benefits for the urban design and water cycle. Water management requires solutions that are applicable, cost efficient and reliable with simple maintenance. While urban design requires solutions that are socially accepted, provide health, aesthetic and educational values. Both aspects have been separately achieved until the emergence of integrated water management which includes water sensitive design[3]

WATER SENSITIVE URBAN DESIGN

Water Sensitive Urban Design (WSUD) first appeared in Western Australia as a new integrated approach to urban planning and design with the aim of providing economic and environmental water management solutions. WSUD is the integration of the urban water cycle, including storm water, wastewater, groundwater and water supply, with urban design. It manages all water resources and their impacts on the environment and the community, providing site-responsive design solutions. This integrated approach of water management is preferred to the traditional one as it reduces the water demand, wastewater production, storm water pollution and development costs, in addition to providing benefits to the urban space.[4]

WSUD aims to raise the value of urban water in the urban design and decision making process, in addition to the process of integration of urban design, with environmental science and other disciplines.[5]

Benefits of WSUD

Application of WSUD adds to the community environmental, climatic, economic and social benefits, besides its main aim to provide an integrated water cycle in the urban area. These benefits are usually a result of using natural methods for water management and treatment, such as using vegetation and water bodies which are included in the landscape of the community. Table 1 provides an overview of the many benefits of WSUD.

Table 1. Benefits of WSUD (By Author, with reference to DENWR[6])

Environmental	Climatic	Economic	Social
• Reduces flood risks; • Protects waterways and ecosystem; • Improves the quality of stream water and groundwater; • Promotes efficient use of water resources; • Maintains hydrological balance; • Increases the quality of groundwater.	• Increases green areas, leading to lower surface heating, urban cooling and improved thermal comfort; • Open water bodies lower urban temperatures; • Increases pervious surfaces reduces their temperatures; • Decentralized application allows cooling over large areas.	• Increases the market value and attracts residents to developments; • Improves the use of resources by utilizing lands that are not suitable for development; • Capital and construction cost savings.	• Provides more public multifunctional spaces; • Raises the awareness of the community about water issues; • Provides an identity and a sense of place to the community; • Enhances aesthetics; • Provides landscape amenities; • Provide health benefits by treatment of wastewater and providing better environment.

WSUD Approach and Tools

WSUD includes various approaches that can be integrated in the urban design of cities and communities. These approaches are:

- Using water efficient features and equipment;
- Reuse and detention of storm water;
- Using water-efficient landscape design;
- Decreasing the negative impacts on the water cycle;
- Using recycled water to preserve watercourses;
- Integrating water management in flexible arrangements and plans;
- Aiming for long term planning;
- Using both centralized and decentralized water management methods;
- Continuous monitoring and evaluation .

These approaches can be implemented using various tools and solutions including sedimentation basins, vegetated swales, constructed wetlands, rainwater tanks, rain gardens and pervious pavements such as in figure 1.[4]

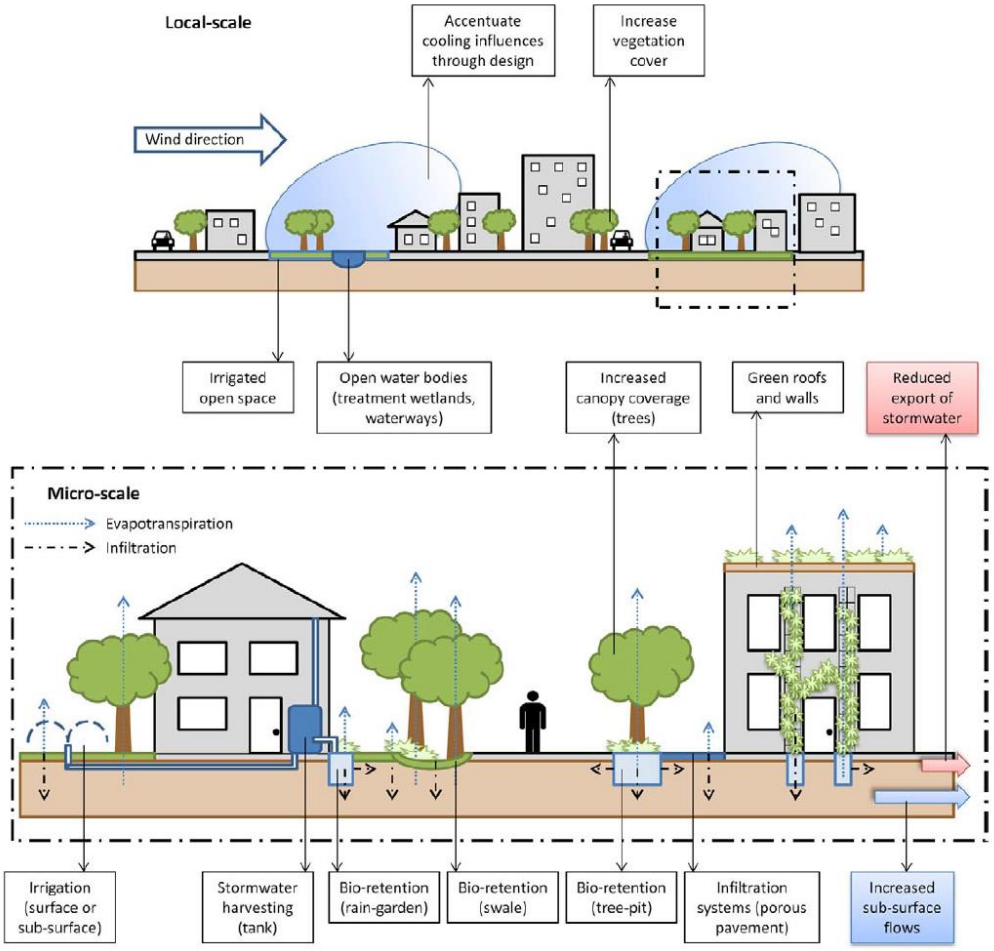

Figure 1. Schematic diagram for WSUD tools that are used at the local and micro scale[7]

EXAMPLES

To examine the potential of WSUD to improve the quality of life, examples from arid and semi-arid regions are studied. Examples are sorted from the most to the least developed regions.

Sweetwater Wetlands, Tucson, Arizona

The City of Tucson has a semi-arid climate. The population and water demands are increasing and the city has faced groundwater decline and droughts, which acted as a driver to look for new water resources.

Sweetwater wetlands are constructed wetland that are used for the secondary treatment of wastewater. Water enters a settling basin to remove suspended solids using vegetation and soil, then the water moves to large wetlands for further treatment and polishing by flowing through the used plants, which allow smaller solids, pathogens and other contaminations to be removed. The water is directed to basins so that some of the treated water is discharged into the river to enhance its ecology and the rest is reused for irrigation of golf courses, parks and schools. During the process, an amount of water is also infiltrated into the soil to replenish groundwater. The reuse of water saves large amounts of fresh water coming from the river and groundwater to be used for potable purposes.[8]

Figure 2. Layout of the Sweetwater Wetlands showing the treatment process[9]

The place serves as a wildlife habitat and a public park for visitors to enjoy nature and observe wildlife. Educational visits from schools are also frequent to teach students and even the public about wildlife and water.[8] The wetlands are considered a public amenity and were designed with coordination with public advisory committee[10],they have restored some of the native habitat that took place previously in the area. The place serves as a foundation for a community park.[11]

Mosquito breeding is strictly controlled to prevent health risks from transferred diseases. An annual controlled burn is held to get rid of dead vegetation and control mosquito habitat. Chemical fogging with low toxicity pesticides (that is approved by the EPA) is also used, which only affect mosquito larvae.[8]

Figure 3. Sweetwater Wetlands as a potential urban park and providing aesthetic values and wildlife habitat[12]

Ecological Water Treatment Park, Lima, Peru

Lima is the capital of Peru, located in South America. Its location is considered one of the largest deserts in the world. Lima faces many challenges concerning water management, due to fast urbanization, climate change and lack of surface water, in addition to the mismanagement of water resources.

The project was located in an old agricultural land that lies in the Chillon River watershed in the North of Lima. The increasing urban growth and development resulted in the takeover of agricultural lands by new settlements, which, due to their informal nature, lack the basic infrastructure for water

management, thus, wastewater is discharged into channels, which are now used to irrigate agricultural lands and recreational areas. The untreated wastewater results in health issues, in addition, the channels are converted into concrete channels, preventing infiltration. Also some channels were closed, affecting previously green area that now lacks irrigation. Thus, a new water management approach was needed to protect water resources and save the community.[13]

Figure 4. To the left, irrigation channel receiving untreated wastewater, and irrigation channels converted into concrete channels to the right[13]

The project is located in a park in one of the new settlements, which lies next to an irrigation channel. The area lacks water systems, thus water is scarce and expensive. A children park is created, consisting of an area for wastewater treatment, surrounded by benches and educational panels, a recreational green area and a play area made from recycled materials. A sub-surface constructed wetland (CW) was designed to treat wastewater with the collaboration of designers and agricultural engineers. The CW was placed in the highest area of the site to minimize the energy required for pumping. A bench is designed at one edge of the wetland to promote integration with the recreational area. In addition, the plants used for treatment were selected to provide an aesthetic value to the park. Along with the water treatment system, the selected vegetation for the park is of low water demand and only 40% of the park is grassy or planted, while the remaining area is surfaced with gravel and rustic bricks and contains some native trees that are irrigated with micro-tubes. The use of a subsurface CW prevented the mosquito habitats which would have been threatening to the children.
Community participation through design workshops raised the awareness and promoted a design that fulfills the actual needs of the community. Educational panels are located in the park to describe the water treatment system and water challenge in a simple method for children.[13]

Figure 5. The constructed wetland integrated into the park, allowing children to learn and have fun at the same time[13]

El-Moufty El-Kobra, Kafr El-Sheikh, Egypt

Egypt is a developing country characterized by a semi-arid climate, the economic base is mainly relying on agriculture, thus the country is dependent on the Nile River as the main water source.[14] The project lies in the Nile Delta, where a network of irrigation and drainage channels exists to provide water from the Nile to agricultural lands. Rural areas in Egypt have low coverage of proper sanitation, thus, wastewater can be running in the streets, leading to poor health and hygienic conditions.

In Kafr El-Sheikh, the majority of the dense population is of farmers owning small lands. Due to the lack of sanitation services, most houses rely on open trenches to drain wastewater, which highly pollute groundwater. The wastewater is discharged in the drainage channels, which is later used for irrigation, leading to severe health risks on the community and the environment. In addition, the inhabitants tend to limit their use of water in an attempt to minimize the produced wastewater, which adds to hygienic issues.[15]

Figure 6. Wastewater running through the streets of El-Moufty El-Kobra. This case is common in other rural villages in Egypt[15]

The project aimed to apply decentralized wastewater management in the village of El-Moufty El-Kobra. It involved the installation of an interceptor tank that is connected to several households and the treatment system. The interceptor tank works on trapping solid wastes and performing a small percentage of the anaerobic digestion required for treatment. The tank is cleaned every 6 months. Liquids are then diverted to a pumping station as in figure 7, to be transferred to the treatment system, which is composed of three stages of stabilization ponds, the first two ponds reduce organic pollutants and the last reduces pathogens.

After treatment, organic or solid waste is dried and collected for reuse. The treated water contains high amounts of Nitrogen and Phosphorous, thus can be suitable for irrigation. The effluent quality meets the Egyptian standards, though some farmers misused the system lately leading to lower water quality.[15]

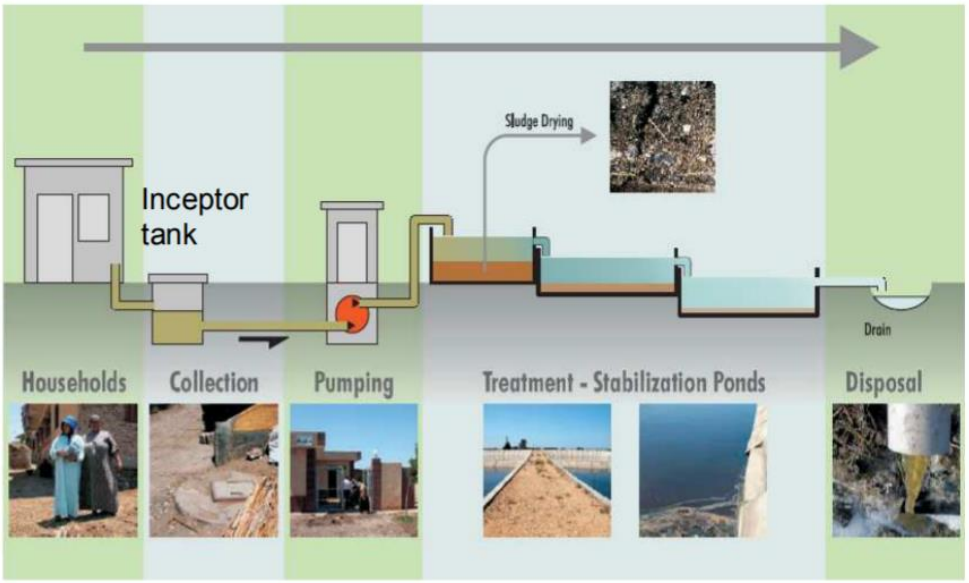

Figure 7. Schematic diagram of the installed treatment system in El-Moufty El-Kobra [15]

The community based approach was critical to allow participation of the farmers. Awareness campaigns were held to increase the knowledge and rational behavior of the population about water. The inhabitants pay operation costs, leading to enhancement of the sense of ownership to the system.[15] The system is not integrated in the village design but it is a step towards achieving better urban solutions in the future in Egypt.

Discussion

Table 2 summarizes the benefits of using WSUD in each of the previous examples;

Table 2. Achieving the benefits of WSUD in the studied examples (By Author)

	Sweetwater Wetlands, Arizona	Ecological Water Treatment Park, Peru	El-Moufty El-Kobra, Egypt
Environmental	The application of constructed wetlands restored the ecology of the area and provided wildlife habitat. It also provided treated water for reuse, which saves other freshwater resources.	The constructed wetland treated part of the wastewater which was otherwise discharged into channels causing pollution and damage to the environment. In addition, it provided a better source of water for reuse.	The treatment of domestic wastewater lowered the degree of environmental pollution, in addition to the benefits of water reuse and the use of dried solid waste.
Climatic	The use of vegetation in water treatment provides better quality of life and better temperature.	The use of plants also provided better air quality and temperatures. In the example, the amount of vegetated surfaces were minimum to save water.	The system didn't use vegetation, therefore, no direct benefits to the climate. Some benefits may include using water bodies, but no accurate data was found on the effect on climate.

Economic	The treated water using constructed wetlands is lower in costs than treatment in other wastewater treatment plants.	The park provided a low cost water treatment facility to the community. No data about the actual cost was found.	The treatment system is lower than other alternatives and the collected fees are convenient to the social conditions of the inhabitants.
Social	The area provides an educational facility for students and adults about the environment and water. It also provides the potential of an urban park for the community. The place also adds to the aesthetics of the region.	The constructed wetland raised the awareness of the community, especially children who visited the park and learned about water treatment. The park acted as a recreational and water treatment facility and provided aesthetic values. The system provided health benefits as it lowered the discharge of wastewater into open channels, which caused severe health risks.	The level of integration of water treatment in the community design was very low, as in developing countries, thus the social benefits were more of providing better health for the community and promoting better hygiene. The solution also raised the awareness of the farmers and allowed participation which promoted a sense of ownership and commitment to the treatment system.

Conclusion

By studying the previous examples, it is clear that application of WSUD in more developed countries aims to be integrated in the community and urban design as the basic needs of the inhabitants are fulfilled, leaving a place for other integrative planning and design, while in developing countries, where the basic need of proper sanitation is not fulfilled, water sensitive solutions are usually applied as separate elements, with no thought of integration in the urban design, such as the case in El-Moufty El-Kobra village in Egypt. In developing countries, the need for community participation is mandatory, as the inhabitants should be aware of the introduced treatment system and should use it rationally. This is provided by making the community responsible for monitoring and controlling the system.

It is also found that in arid and semi-arid communities, the selected methods for WSUD usually include vegetation, as the use of plants provides better air quality and lowers the average temperature. However, using plants in areas with low quality of water provides a habitat for mosquitos, which may cause health risks. This should be controlled by mosquito control techniques or by providing sub-surface treatment of water such as in the Ecological Water Treatment Park in Peru.

Finally, promoting organizations and NGOs that are concerned with integrated water management in arid and semi-arid developing countries will encourage efforts to fulfill the basic needs of communities using integrative solution that offer other economic, environmental, health and social

The study recommends high efforts in implementing WSUD in developing countries to improve health and livability of these areas. Implementation should be preceded by awareness and community participation campaigns. These efforts should be included in the national development plans to ensure a clear vision that aims to achieve integration of water management in the urban design.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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WATER EFFICIENCY IN BUILDINGS AND LANDSCAPE, EGYPT

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INTRODUCTION

29% of the global population (2.4 billion people) lack access to available safely managed drinking-water service. Contaminated drinking water is estimated to cause 502,000 diarrheal deaths each year, mostly children in developing countries (WHO, 2017).

The driving forces and pressures on world water resources are the combination of both natural conditions and humanity's actions. Climate change and natural variability in the distribution and occurrence of water are the natural forces.

Some of the main driving forces of humanity affecting water resources include higher demands for food security and socio-economic well-being, pollution from industrial, municipal and agricultural sources and population growth, particularly in water-short regions (UNESCO, WMO and IAEA, 2010). By 2025, half of the world's population will be living in water-stressed areas (WHO, 2017).

WATER RESOURCES AND CHALLENGES IN EGYPT

Despite Egypt has the Nile River, it is shared by eleven countries and Egypt is the most downstream country in the Nile Basin and. Egypt receives about 98% of its fresh water resources from outside its national borders (Zweynert, 2012). The Nile water quota is only 55.5 bcm per year, has not changed since 1959 (Allam, 2007), with a population of 95,772,623 (CAPMAS-1, 2017) so the share of water per capita is 579.4m3/year while the world scarcity limit is 1000 m3/year as shown in figure (1) below.

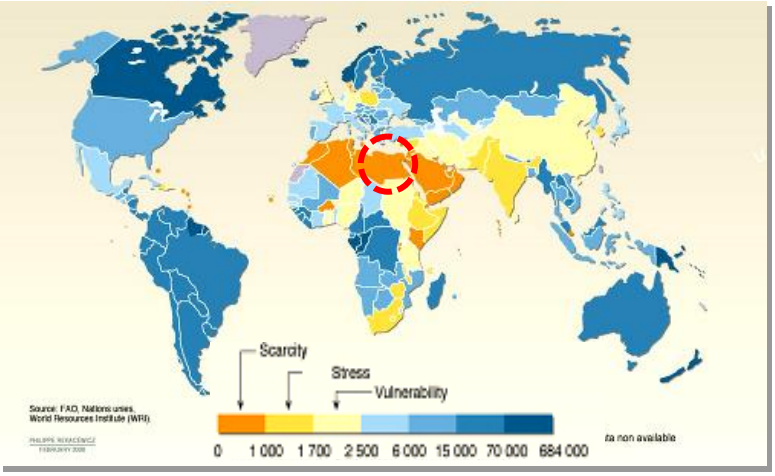

Figure 1. Fresh water availability on Earth in 2007 (FAO and WRI, 2008)

Water resources in Egypt are confined to the withdrawal quota from the Nile water, as shown in figure (2), the country hardly has any other fresh water resources (CAPMAS-2, 2017).

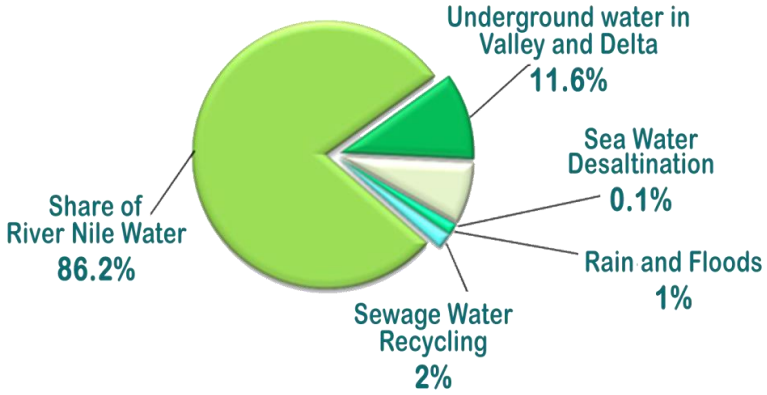

Figure 2. Percentage Distribution of Egypt Water Resources (CAPMAS-2, 2013)

The driving forces and pressures on water resources in Egypt are mostly caused by human actions (Allam, 2007). The only natural driving force on water resources in Egypt is that the main resource of Egypt's water stems from the Nile, which means that it depends on rainfall outside of its territory (UNEP, 2000). The main challenges of water resources in Egypt are:

- Egypt and Nile basin countries situation
- Absence of security and restraint of law and order
- Lack and weakness of regulations for water misuse and extravagance.
- Lack of Information.
- "The Unaccounted-for" unaccounted water losses.
- Conflict of responsibilities between water authorities.
- Population, Agriculture and Food security
- Water resources pollution.

According to WHO and UNICEF report in 2017, the safely managed drinking water is defined as an improved drinking water source that is located on premises, available when needed and free from contamination. A household is considered to have access to improved water supply, if it has sufficient amount of water for family use, at an affordable price, available to household members without being subject to extreme effort, especially to women and children (Chung, 2011; UN-HABITAT, 2005).
All the aforementioned challenges affect directly the quantity and the quality of fresh water supplied. These challenges including the extravagant consumer behavior have contributed in wasting more than 50% of the purified drinking water; consequently, Egypt will suffer considerable water shortages in the near future. When the water shortages will begin to occur, there will be no availability and it is inevitable that the poor will be the first segment to face the crisis and suffer from the water shortages especially the water expenses. In Egypt, 1.5 million in urban areas are deprived of access to safe water, (ISDF and UNICEF, 2013), around 4% all urban dwellers do not have water connection, especially in urban slums and poor informal settlements (MHP and Elzanaty, 2014).

WATER ALTERNATIVE RESOURCES

In order to relieve the stress of water challenges, it is a must to consider the alternative resources, below are the advantages and disadvantages of the water alternative resources.

Table 1. Advantages and disadvantages of Water alternative resources

Alternative resources	Advantage	Disadvantage
Seawater desalination (Fouly, 2000 and UNEP, 2010)	• Providing safe drinking water in arid, coastal regions • Supply great quantity of fresh water	• High economic cost and energy requirements • Only available in coastal regions • Bad practice and maintenance cause severe pollution and toxicity
Black water (UNEP, 2010)	• Substituting the drinking water to water not intended for drinking uses • Not subjected to geographical considerations	• Needs complex treatment processes • If not treated properly can cause diseases
Moisture harvesting-Nanotechnology (Chhatre, 2011and Parker, 2006)	• Can supply fresh drinking water from natural renewable source	• Still in experimental phase • Easily affected by any contamination • High experimental and manufacturing costs at large scale • Vary to climatic conditions
Rainwater Harvesting (Worm, 2006)	• Costs can be reduced by simple construction and the use of local materials • Quality is better than other water resources • Renewable and no damage is done to the environment. • It provides water at the point of consumption.	• Regular inspection, cleaning, and occasional repairs are essential. • Quality may be affected by air pollution, insects and organic matter. • Dependent on season • Depends on amount of rainfall, size of catchment area and storage reservoir.
Greywater (http://www.nachi.org/; Nolde, 2008)	• Cost savings in fresh water and sewage costs • Needs smaller storage facilities than RWH • Nutrients from kitchen wastewater are able to help replenish the fertility of soils • Easier to treat than Blackwater	• Improper handling could impose serious health hazards • Require regular maintenance • Implementing filtration and treatment systems can be prohibitively expensive • In some jurisdictions, indoor use of greywater may be prohibited • Some municipalities require expensive and complex permits and to operate it.

The alternative resources of water in Egypt are so limited and not all are suitable for the actual conditions and capabilities (Aquastat, 2009). According to the above table, concerning the health aspect the Greywater Recycling and Rainwater harvesting systems are safer than the Blackwater as it is controlled and treated much easier. Both systems are safer to the environment than the Seawater Desalination and Blackwater. Therefore, Greywater recycling and Rainwater harvesting are the most feasible alternative water resources that can be used safely to ease the water crisis as these systems can achieve more than 50-80% efficiency (http://www.combinedharvesters.co.uk/). Also they are more

practical as they consist of wide range of systems techniques and types of treatments which vary in specifications and costs.

Rainwater Harvesting

Rainwater Harvesting is often characterizes with better quality than other water sources and it may be received in the form of water, snow, sleet or even hail (AbdEl Shafy et al., 2008). Rainwater harvesting can be defined as to collect, convey and store rain for later use. The water is generally stored in a rainwater tank or directed to recharge groundwater. Treatment of rainwater can include filtration, biological treatment and disinfection (N. Khoury, 2008). RWH is also used in many parts of the world as a drinking water source. With RWH the savings in potable water could amount up to 50% of the total household consumption and can be installed in both new and existing (Khoury 1), 2008; UK Environment Agency, 2010).

Applications of RWH (Khoury, 2008):

- Drinking water (non-polluted areas)
- Toilet flushing
- Gardening and irrigation
- Industrial uses
- Washing machine
- Car washing.

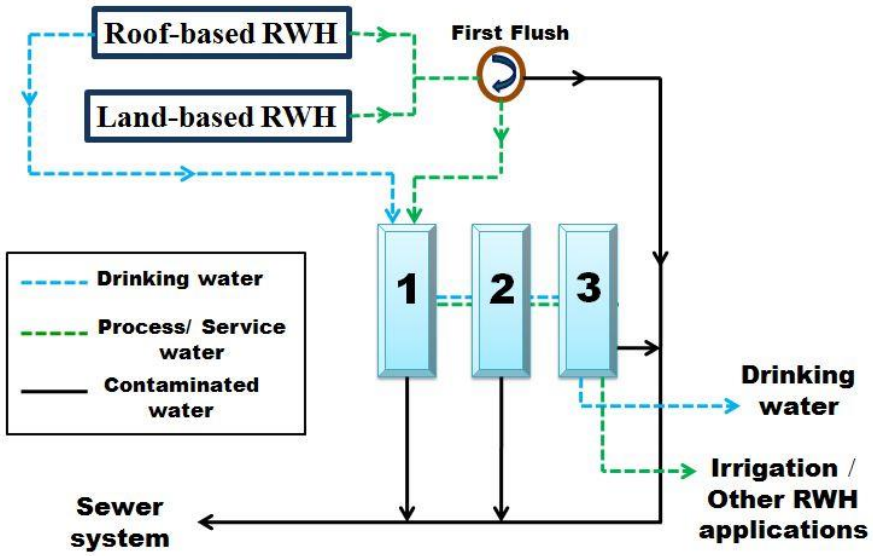

Figure 3. Rainwater harvesting (by author)

Greywater recycling

Greywater is defined as all wastewater that is discharged from a house, excluding blackwater (toilet water). This includes water from showers, bathtubs, sinks, kitchen, dishwashers, laundry tubs, and washing machines (FBR, 2005). It makes up the largest proportion of the total wastewater flow from households in terms of volume. Typically, 50-80% of the household wastewater is GW. If a composting toilet is also used, then 100% of the household wastewater is GW (Nolde E., 2008).

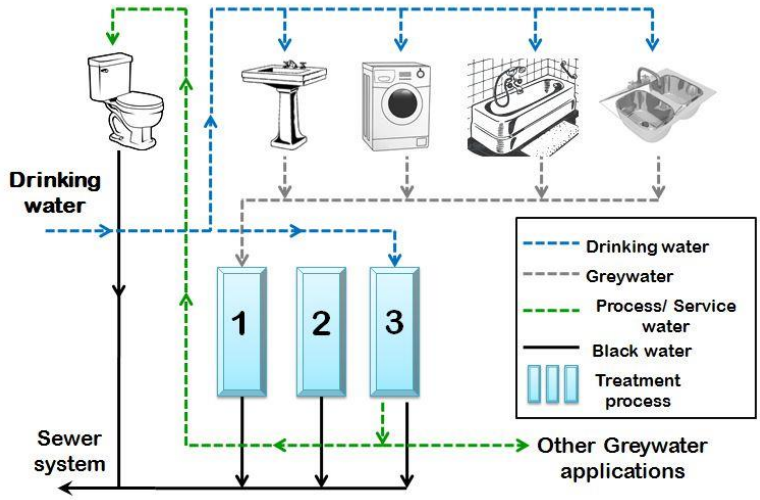

Figure 4. Greywater recycling (by author)

Treated Greywater can be used in toilet flushing, gardening, industrial uses, washing machine, car washing (Nolde E., 2005). Reusing GW can be as cheap and easy as bucketing water or by using simple systems made of cheap and local material as shown in figure (5), or as complex and costly, see figure (6), as installing automatic greywater diversion, treatment, distribution and/or irrigation systems as (Ng May, 2004)

Figure 5. Simple Greywater systems
To the left: The 4-barrels Greywater system in Lebanon (LATA, 2010). To the right: The rooftop storage system at the King Abdullah Mosque, Jordan (http://csbe.org)

Figure 6. Greywater treatment plant for GIZ building, two views for the MBR treatment system (http://saniresch.de/en)

Decentralized and centralized GW systems:

Decentralized systems are the GW collected from one or more apartments is treated inside the house while Centralized systems are to collect and treat the greywater from several apartments or houses in a treatment plant outside the house.

Combined Rainwater and Greywater

Combined Rainwater and Greywater can achieve more than 50-80% efficiency (http://www.combinedharvesters.co.uk/) but it is necessary to consider that the quality of Rainwater Harvesting is superior to that of Greywater yet its amount depends on the amount of rainfall, size of catchment area and storage reservoir. Also the quality of Greywater varies depending on the source and treatment systems yet treatment systems must be capable of treating the Rainwater Harvesting and Greywater to the required standard (Mustow and Grey, 1997). Both systems can be installed in both new and existing buildings (UK Environment Agency, 2010; http://www.nachi.org).

Figure 7. Combined rainwater harvesting and greywater recycling system in Severn Trent Headquarters, Coventry, UK (http://aqua-lity.co.uk/)

RAINWATER HARVESTING AND GREYWATER RECYCLING SYSTEMS IN EGYPT

Greywater is proposed to be used in cities lack rainwater rate less than 200mm as it is not dependent on season and not affected by geographical location like Rainwater harvesting

The combined Greywater and Rainwater harvesting systems are proposed only, in the area located in Alexandria and Sinai, because Rain harvesting is the best solution particularly on the north coast by the Mediterranean Sea and the Red sea as the mean annual rainfall more than 200 mm/year as shown below in figure 8 (Abd El Shafy et al., 2005).

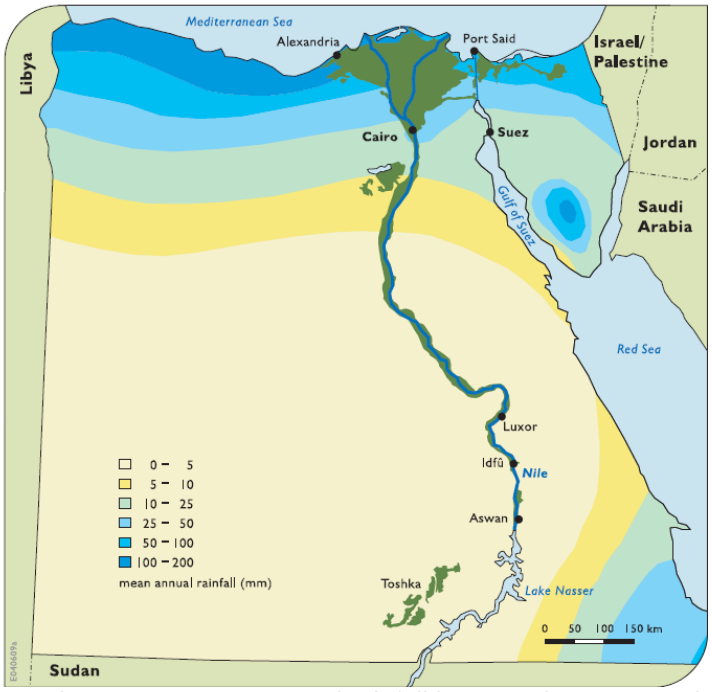

Figure 8. Average annual rainfall in Egypt (MWRI, 2005)

In 2015, Alexandria's poorly maintained infrastructure and perceived governmental negligence caused about 60% of the city area was flooded as in figure (5) from 0.5 up to 1.0 m (Zevenbergen, 2016). This event forced the government to inspect the network including manholes and pumping stations to make sure that it will not recur again (Al-Ahram Al-Masaee, 2016). Unfortunately, these precautions surely will avoid a disaster but will also direct all these amounts of fresh water to be wasted into the Mediterranean Sea.

Figure (9): Alexandria flood in October 2015 (Al-Ahram Gate, 2015)

According to all the advantages of Greywater, it is being considered in the first place due to its continuity and relatively clean nature and can be further guaranteed if all the health precautions are considered and applied (FBR, 2005). The costs of greywater and Rainwater harvesting systems vary depending on the cost of system, materials and simplicity or complexity of the plumbing works. Accordingly, it can be adopted in both rural and urban areas also the system can be determined depending on the consumer purchasing power and property type and specifications.

Embracing Greywater and Rainwater Harvesting systems in Egypt

Considering the water resources challenges, following are some initiatives achieved by other countries in order to embrace these systems:

- Local systems: The government of Cyprus adopted the GW treatment plant as a water conservation measure since 1999, CYPROBELL® is a local Cypriot innovative device to treat and recycle household greywater. The system can be adapted to the specific needs of each customer in terms of size, cost, and degree of automation required, to accommodate the needs of a family or a large institution (http://www.hydranos.org).
- Government subsidies: The government of Cyprus subside the purchasing and the installation of greywater treatment plants as on 1999 the subsidy was 350€ until 2009 it reached 3000€, accordingly, the interest for the system by the public was increased with the increasing subsidies. (Kambanellas, 2009).
- Tax exemption: New York state water harvesting legalization would create a tax exemption program for commercial and residential real property owners who purchase or install systems for rainwater harvesting (NCSL, 2012)
- Water recycling obligation: In Tokyo, greywater recycling is mandatory for buildings with an area over 30,000 square meters or with potential reuse of 100 m3/day (CSBE, 2003).

As the government in Egypt lays hold of the main strategic assets such as Water, Electricity and Natural gas so it can give facilities and advantages for public who considers the measures for green building and issue verification that a building, home or community was designed and built using strategies aimed at achieving high performance in water efficiency.
According to the economic circumstances in Egypt the previous offers may not be tempting for the building owners and operators therefore it is suggested that the government should also encourage the owners by delivering attractions more than forming legalization to force the public to use the water saving systems.

STUDY CASE: COMMUNITY HOUSING IN SMOUHA IN ALEXANDRIA, EGYPT

The study case is only an approach for proposing the Greywater recycling and Rainwater Harvesting on an Architectural perspective and does not focus on chemical, mechanical or civil engineering.
Also, the consumer behavior and ideological studies were not included.
Smouha community housing is a major affordable housing project being developed in Egypt since 1989 by General Authority of Community Building and Housing. The project consists of 152 residential buildings range from six to 11 storeys. Each building is surrounded by one green area or divided to two. The green areas range from 100-150m^2; these areas are planted with trees, small shrubs and no fruit trees or plants.

Figure 10. on the left: a map relocating community housing buildings by number (SCHA, 2018), on the right: a view of the buildings and green areas. (http://resala.com.eg)

Smouha community housing was chosen as a study case because it has similar building with inhabitants with similar characterization. And selecting a project that does exist is much harder than new project with new infrastructure networks and plans.
The combined systems were proposed as rainwater in Alexandria occurs only in the winter season in the form of scattered shower. Therefore, it cannot be considered a dependable resource of water.
it is proposed to be only for toilet flushing and landscape irrigation systems as following:

- The combined Greywater Recycling and Rainwater Harvesting shall be installed as decentralized systems in the open courts of each building.
- The treatment systems shall be installed in the buildings open court outdoor in the ground floor inside a small sheltered place suitable for operating and maintenance..
- The storage tanks to be built or erected underground in the building garden as shown in Figure 11.
- The service water applied for irrigation shall be installed to the subsurface to avoid any contact with the greywater.
- The service water should not be applied to fruits and vegetables that are eaten raw. For watering of fruit trees, greywater can be applied under mulch

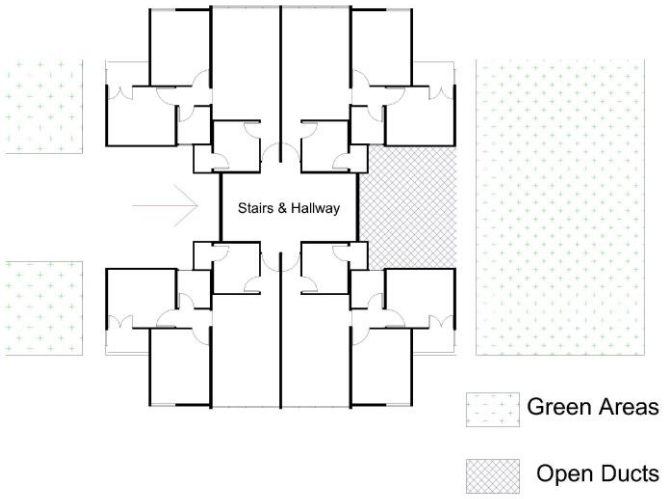

Figure 11. Typical Building model (by Author)

RECOMMENDATIONS AND CONCLUSION

Although rainwater is the water source with most purity, in Egypt rainwater harvesting alone is not enough to satisfy the water demands for the non-potable uses. According to its availability, rainwater harvesting will not be effective in all the regions of the country. Even regions with high rainfall density cannot rely on rainwater harvesting systems alone as these systems will require very large catchment areas and large amounts of storage to supply water into the dry months. Also the unpredictable nature of rainfall, coupled with its seasonal fluctuations would make it difficult to rely on by itself as a supplemental water source. So, the viability of RW and GW in combination as a realistic water supply for non-potable uses will be most successful as they are the most recommended drinking water alternative systems to be used in Egypt in order to save the drinking water but regarding the rainwater harvesting systems they are more preferred if:
The system will be used in regions with 200-500 mm/year rainfall density such as Alexandria and Sinai and more preferable to be used in new cities and buildings such as: Borg El Arab, King Mariout and North coast resorts in Alexandria and touristic resorts in Sinai. Harvesting these amounts is

valuable and a simple construction of RWH system can suite the lowest budget as the low-cost tanks (e.g. made of Ferro cement, plastics or stone/bricks).
RWH systems are recommended to be installed as large scale land-based systems with wide catchment areas such as: parks, parking lots, roads using systems like: infiltration basins or trenches, swales and trough trenches systems that will guarantee a greater amount of harvested rainwater. Also the roof-base systems can be used but they cannot be a dependable resource according to the amount of harvested water, as for example in Alexandria, 76.7% of households live in housing units with less than 90m2 net area in multi-storey buildings comparing to 2.9% living in separate house or villa (USAID, 2008) and Sainai the built areas are so limited comparing to outdoor spaces in resorts, for example, or landscape areas, streets, highway roads and unoccupied areas.
If a region not relatively with high rainfall density, so the only alternative system recommended is the greywater systems. As greywater recycling can be easily obtained by considering the technical and health requirements, so it can be achieved more practically in decentralized small scale systems in residential or public buildings but with flexible specifications and obligatory guidelines and restrictions to guarantee the success of the systems. Hopefully, an authority shall be responsible for presenting offers and initiatives to encourage the society to use the systems, applying the operation and maintenance restrictions.
It is recommended that RWH and GW to be purchased and installed in new constructions and new cities as it is more cost-effective; the costs of retrofitting might be high and the process disruptive. Also there are many variables to be considered during the design and construction phases in order to identify the suitable system for a building such as:

- System type
- Site and building conditions
- Several site and landscape design considerations
- Soil parameters and planting selection
- Storage tank place (underground or above) and space
- System treatment and noisiness

Accordingly, every building has special condition and needs to be studied separately.
The same with the centralized systems, which are implemented on large scales, the neighborhood or district have special conditions and also need to be studied separately for (these studies are usually made by manufacturing companies specialists according to the countries codes or imported codes legislated by other countries).
Currently, it not wise to set specifications to RWH and GW systems that can be embraced in Egypt as these systems are considered as new systems in the Egyptian market but there are two important steps to be initiated before using these systems in Egypt: First, Systems installation and using code or regulations must be adopted then government-to-consumer encouragements and obligations have to be in act to help these systems to reach the consumer properly relatively to his economic and social living.
On the other hand, the water challenges in Egypt have to be addressed and the potential opportunities, Egypt can achieve, have to be considered through paying attention to the unconcern and disregard matters that affected Egypt's' system all these years and reflected into the public behavior concerning water issues. The most important step towards water security that all stakeholders in the community: the government, local associations and companies, different segments of the public, NGOs and NPOs, shall recognize their role and work on it in order to put an end to water crisis in Egypt.

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CHILD FRIENDLY CITY APPROACH: PROS AND CONS

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INTRODUCTION

The authors of this study, who are also industrial designers, have attempted to extend the concepts from a design perspective as a primary function for innovation in government and business and also in other social and organizational units and then make their proposals. “City” is taken here as an object, embracing all designs, with a lot of complexities. Currently, there are at least 400 million women, men, and children in the world whose basic rights, such as health and wellness, are not fulfilled. [1] On the other hand, there are organizations, such as UHC and WHO, aiming to provide equality and health around the world and to build healthy cities. This study aims to remove barriers and boundaries to create more democracy for a healthy city so that this city can be pleasant for people with different walks of life and at all ages. This is mainly because teenagers, as the most dynamic age group for creating a teenager-friendly city, have been neglected in all studies and the attention has been mostly focused on a child-friendly city. This study attempts to challenge the belief that “a child-friendly city is an all-friendly city.” In the first step, a child and elderly-friendly city will be investigated and then teenagers will be discussed. In the second step, the healthy city and design for all will be investigated, and finally, a city and all-friendliness will be analyzed and suggestions are put forward.

1 A CITY AND CHILD- AND ELDERLY-FRIENDLINESS

1-1 A city and child-friendliness

According to the Regulation of the Ministry of Women Empowerment and Child Protection, a child-friendly city is an administrative area development system that joins the government, community and business world commitment and resources, to promote the rights of children under comprehensive planned projects and programs. Western countries have paid attention to children and urban spatial relationship since the 1920s, and began to create CFC in 1990s.[2] The idea of KLA was suggested in Kevin Lynch's research, proposing that the best environment for children is a city that has clear regulations and provides the same opportunity for children to understand and explore their surroundings or the world.[3] In many studies, it has been discussed that, according to these interpretations, a child-friendly city is an all-friendly city.[4] During their age of development until school age, children need to have an equal share of time for

playing and learning. In fact, playing is the world of children and it is through playing that children learn life skills. [3]

1-2 A city and elderly-friendliness

Population ageing and urbanization are two global trends that jointly make up major forces forming the 21st century. As cities are growing, their residents aged 60 years and above are increasing. Older people are a valuable resource for their families, societies and economies in caring and empowering living environments. Therefore, the elderly are more capable of voicing their needs in comparison with teenagers or even youngers. WHO considers active ageing as a lifelong process informed by several criteria that, both independently and together, promote health, participation and security in older adult life. There are both benefits and obstacles that older people face in cities at different stages of development. In fact, an age-friendly city is intended to provide a universal standard for an age-friendly city. [5]

2- TEENAGERS

The origin of the word adolescent is the Latin verb "adolescere" meaning "to grow."[6] In most studies, adolescence is considered ages 15 to 19. However, adolescents between 10 to 14 face more risk and crisis. More importantly, families and friends are unaware of their considerable physical, emotional and social growth.[7] The second decade of life, adolescence, is a stage in a person's life rather than a fixed time period,[6] a phase in which an individual is no longer a child, nor an adult yet. Adolescence is a time of opportunity as well as a time of risk. It presents a window of opportunity because actions could be taken during this period to provide the conditions for a healthy adulthood and to reduce the chance of problems in the years that are to come. At the same time, it is a period of risk, a period when health problems that have serious immediate consequences can and do occur (such as deaths resulting from road traffic injuries, and sexually transmitted infections and unwanted pregnancies ensuing unsafe sexual activity); it is a period when behavioral problems, which could have grave, negative effects on health in the future (such as smoking and alcohol consumption), are initiated. Adolescence is also called the awkward age because during this period there is a peculiar transition from childhood to adulthood.[8] In 1995, WHO, with the cooperation of UNICEF and the United Nations Population Fund (UNFPA), played a pivotal role in providing a healthy environment for adolescents. But, the point worth considering in regard with adolescents is that different groups of adolescents, from various parts of the world, acknowledge two key, common characteristics. They want to be treated with respect and to be certain that their confidentiality is protected. In addition, the ability to respond to adolescents with empathy and sensitivity will contribute to the development of effective communication and mutual respect. Judgmental, thoughtless and unfriendly behavior will hamper communication. It is also likely to estrange adolescents. [8]

Adolescence, by leaving behind childhood, creates a serious crisis, which in fact may lead to psychological problems and unbalance, and social alienation, which all can cause aggression.[9] High rate of suicide signify this psychological crisis: the third cause of death in the youth is suicide.[10] Their main characteristics are personal instability, contradictory traits, ambitions, and less dependence on parents. Also, other important behavioral features are searching for identity and social growth.[11]

3- A HEALTHY CITY

At least 400 million women, men and children around the world are currently deprived of a basic human right, which is access to affordable health care. [1] The environment has long been known as a key factor of

health. Urban planning as a mechanism of environmental control affects health in systematic ways. For decades, researchers have done research to study the relationship between human health and the created environment. Different factors in a building influence its safety and hygiene, one of which can be establishing balance between different groups and taking necessary actions to build a balanced city development program where benefits are distributed fairly among people. It is noteworthy that a range of differences in the city hampers the process of a successful experience in cities.[12] If urban planning is taken as a determination of health, planning in a democracy has to be about brokerage, and responsibility should be taken to perform such planning,[13] especially now that democracy has become more prevalent in modern times.[14] It is the role of the city as impresario to bring people together. [14] It should be accepted that not only is it crucial to examine the chemistry, biology, physics, ecology, or economics of environmental problems, such as global warming and climate change, air pollution, water shortages, depletion of natural resources, and loss of biodiversity indeed rooted in human behavior, but it is also critical to understand the importance of the behavioral scopes and study ways we can influence and change it.[15]

4. DESIGN FOR ALL

There are many definitions proposed for the concept of design. In fact, design is an activity which gives direction and organization to life activities. Generally, design is the process of creating, selecting, and deciding.[16] Design for exclusion includes different methodologies of design, one of the most branches of which is design for all (DFA), inclusive design (ID), and universal design (UD). These discussions actually address the needs of contemporary society, and today more than any time, there is a large variety of age, cultures, abilities, and disabilities. Accordingly, it can be argued that design for inclusive is a definition of "no standard user."[17] It should be mentioned that in UD discussions are not just for people with disabilities. It is not wrong to say that UD includes people who are somewhat ignored by the designers, such as individuals aged 10 or 11 who are not considered children any more.[18] This concept is not limited to design or the immediate environment, but it is also a political movement towards democracy and equality between people.[19]

5- VIRTUAL REALITY IN URBAN DESIGN

The prevalence of virtual world among adolescents is undeniable. In this environment, they grow up, find friends, play games, and receive education. In fact, adolescents refer to this environment to form and find their identity and socialize. Actually, cloud systems and games become part of their identity.[20] Virtual Reality (VR) spaces that can be navigated, as seen in some large scale VR software such as Second Life or Active Worlds, have the potential to be utilized for the aim of agreement building. The inclusion of VR in Urban Design Support System (UDSS), and features such as building reconstruction or renovation design games, urban landscape design, Geographic Information Systems (GIS) or evacuation simulations, has long been a seriously researched or developed topic due to the variety of VR spaces. Computer scientists have been deeply concentrating on cloud computing technologies (Chowdhury, 2012). Cloud-based VR, with the development of numerous simulation options, and a more customized user interface, can also have many different applications, whose devices are no longer bound by space, time, or performance issues.[21] The level of potential and efficiency of portable computing devices for agreement building is unimaginable. After the introduction of the existing research, it can be argued that cloud-based VR has the potential to affect several major changes to urban planning processes.[22]

Method

This qualitative research, which has been conducted through observations and investigations, first studies a healthy city which is friendly to children and the elderly, based on what has been defined by UNICEF, WHO, and UHC. Then, it studies the most sensitive age group of society, i.e. adolescents, because little research has been done on adolescent-friendly cities. The current study aims to initially help create cities that are adolescent-friendly and then cities which are equally friendly for all. Then, from DFC perspective, there are discussions on democracy and balance in society by creating equality and converging all the directions. While a city should be thoughtful of children and the elderly, it should also be dynamic for teenagers. To achieve this dynamicity, architecture in Virtual Reality is mentioned as well as the important role it can have to provide a pleasant and desirable atmosphere for adolescents. The important point is that this age group of society are the most psychologically sensitive age group. They do not have the power to express their desires. They also want to discover the world of adults and to socialize. They do not like to be considered as children and always expect respect and attention.

Results

According to the results of data analysis and observations, a city can be sustainable and friendly for all only if it manages to remove barriers and tendencies and to create balance, one which pays attention to adolescents by removing obstacles such as being only pleasant to children or safe and convenient for the elderly. Adolescents strongly desire to be considered as adults, and childlike environments can be irritating to them, for instance 10 or 11-year-old adolescents who are hospitalized in the pediatric ward will definitely not enjoy the sharp childlike atmosphere[23] and the games, which causes dissatisfaction on their part. It is the same case for urban spaces which are assigned for children's playing. It should be remembered that this age group is not considered children anymore and their priority is not playing games but tend to make relations and socialize[24].

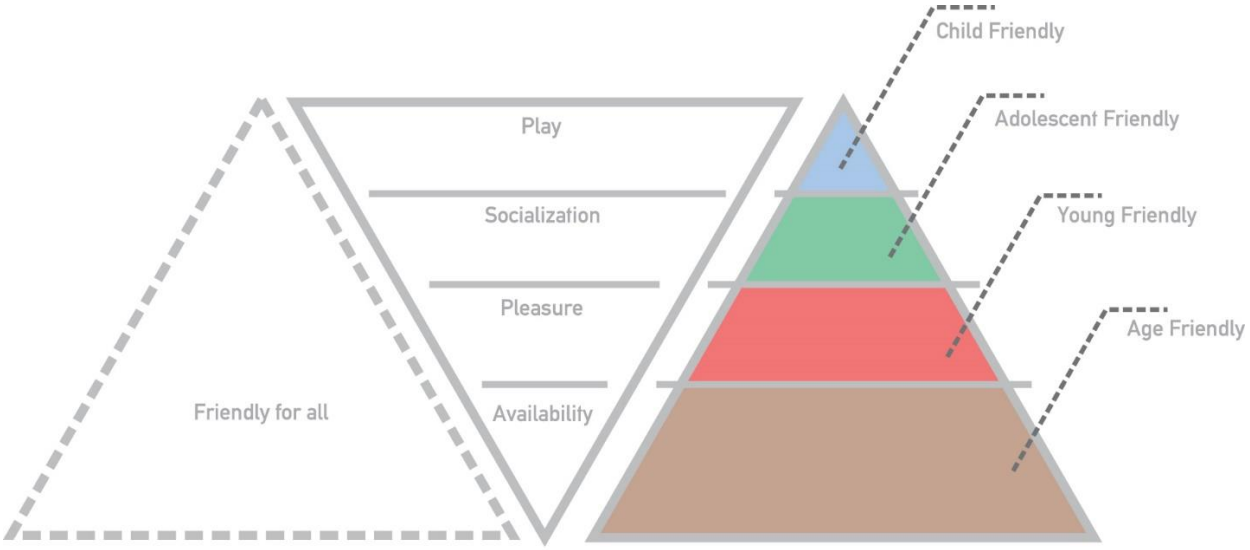

Figure 1. Removing boundaries and making a neutral environment(source: authors).

Figure 2. A third place, which has a value for teenagers(source: authors)

CONCLUSION

If Universal Design (UD) is for all, then this paper proposes the removal of all barriers in the city and gather all age groups in a harmonious and neutral environment, one which is, either outdoor or indoor, is not designed for children's playing or one which is convenient for the elderly, but one which is designed for children and the elderly as well as adolescents' dynamicity. This is because when the design leans towards an age group, it can cause physical and mental obstacles for other age groups. Also, this study suggests that some third places should be created for adolescents as such places are provided for children to "play." Adolescents need to receive attention, socialize, and discover the adult world, and they also despise being considered as children. An environment or a third place should be designed for them physically or virtually, a place looking like a café with a staff of psychologists, councilors, or even adolescents themselves. Such a place can be an opportunity for them to connect, grow, socialize, and finally be healthy. In fact, a pleasant city should encourage all age groups to be normal, and a normal and therapeutic environment can guide society towards positive goals.

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ANTHROPOLOGY WITHIN INFORMALITY: THE COMMUNITY CULTURE AS A POTENTIAL IN UPGRADING INFORMAL SETTLEMENTS IN EGYPT

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INTRODUCTION

In recent years, Egypt has confronted a gigantic problem, concerning the growth of slums and informal settlements in frequent districts all over the capital. Consequently, according to the report from the ministry of local development in 2007, the population of slums in greater Cairo region only reached 6.2 million, and the national level of the slums' population reached 16 million, which is nearly 25% of the all over population of Egypt[1] . Another study was done by David Sims proved that the actual percentage of Informal settlements' population in GCR(Greater Cairo Region) in 2009 is about 63% of the whole population in the capital , consequently the informal areas reached 69% in the year 2016,which is considered an alarming issue [2].Moreover, Slums in Cairo are not only considered an inhabitants' problem or squalid parts suffering from lack of services, it's also considered a complex phenomenon. In that paradox the social, cultural, and economical characteristics are declined massively with an indefinite rate, and also the hygienic aspects (for certain types of informal settlements) find a dangerous deterioration.

Some urban researchers and experts highlighted the importance of understanding the relation between residents' and their entire urban space within certain Behavioral & Cultural attributes.

Therefore the research aims at discovering Behavioral cultural patterns in the Egyptian Community as an expedient of development for the informal settlements in Greater Cairo Region. In addition, the paper presents implemented upgrading projects in developing countries , like, Brazil, which began to initialize the social aspects as a tool in upgrading projects, and how the inhabitants' capabilities and their simple professions were successfully integrated in the design process. Finally, a comparative analysis is presented between upgrading projects in *Cairo* and *ReodeJanero* in Brazil to be synthesized into certain recommendations and design criteria in upgrading procedures.

RESEARCH OBJECTIVES

The informal housing areas were treated as undesirable areas from its beginnings in 60s, and their social structure was also ignored during the attempts to certain development in late 90s. This led to a sense of isolation from the inhabitants of these areas, which they consider their communities that express their own identity. There has been no response to the wrong attempts to change or obliterate their identity by claiming to elevate them as individuals by stereotyping upgrading images, within eviction and rehabilitation with ignoring their social characteristics under the pretext of development. Thus, the main objective of the research, is trying to understand the inhabitants' culture, their social interaction to be interpreted as a development tool to the upgrading process. Moreover, the research tends to understand the patterns of culture and behavior of the society and the relationship of those

patterns to the development of informal areas, in addition to monitoring the development problems that result from the lack of knowledge of the society variables, its behavior and their impact on the urban environment.

In addition the researcher illustrates different attempts of upgrading projects of local informal areas and international examples. Furthermore, their policies, characteristics and methodology are compared and analyzed, to arrive at the conclusion of the results and emphasis on research objectives.

INFORMAL SETTLEMENTS DEFINITION

Informal Settlements or slums is a term used to refer to the deterioration of some urban areas, which means that these areas are unplanned and illegally constructed in the sense that they are not necessarily slums, although they are informal / illegal. They tend to lack appropriate infrastructure and public services, and also reaching high levels of overcrowding[3]. It has been identified with the name "Informal Areas" instead of "Slums" by the Informal Area Development (ISDF), which was established in 2008 after the incident of *Doweika Crisis*[4].

The budget allocated for the development of informal areas is also insufficient to meet the needs of the local community and to do all that they require in order to develop with its multiplicity and population density.

The Paradox of upgrading informal areas

The spread of informal societies in the cities and villages of Egypt and the deterioration of the standard of living; by the lack of services and low level of the urban environment and high poverty, is a pressure factor on successive governments requiring rapid intervention. This led to the multiplicity of plans and programs to develop and improve these areas. However, most of these attempts did not achieve the desired results from developing and raising the standard of living of the members of society[5]. This paradox occurred because of several reasons; including lack of interaction with the local community, the separation of development plans, priorities and urgent needs, lack of follow-up and maintenance of what is being implemented[6].

The alternative approach to government programs was to rely on the local community for development, as a more realistic solution for implementation, especially in the poor and degraded areas of developing countries, which is known as the concept of *Community Development*. There have been numerous attempts and experiences in the development of informal societies that follow this approach, such as the development of the western region of Al-Munira in Giza,[7].

Cultural and Behavioral patterns of Informal areas

As there is a global agreement to integrate the aspects of social participation to develop and revive informal areas, thus, there is an impaired demand of a deeper understanding of the society and its needs. Therefore, the research identifies the specific cultural and behavioral elements of each society and thus positively affects the overall development system upgrading. This is to ensure the self-sufficiency of the society, to achieve its basic needs and to develop its culture.

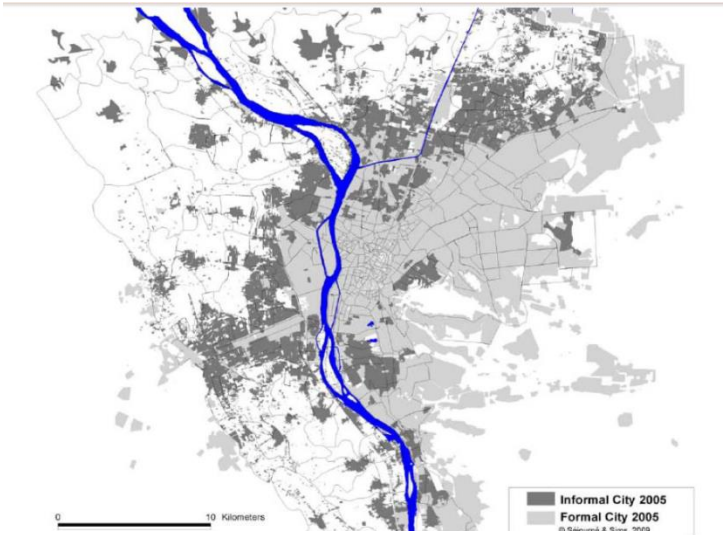


Figure 1 The figure shows the spreading of informal areas in the year 2005

Anthropologists' theories and the impact on urban form

In the decade from 1870 to 1880 a number of Anthropologists and sociologists like *Tylor* presented more than a definition of culture. In the end, they agreed that culture; is the complex that includes knowledge, belief, art, creation, law, social customs and other social possibilities .Moreover, *Amos Rapoport,1978* who have valuable contributions in terms of social interaction and the impact on urban space have defined the concept of human culture and settled on the *Culture* term definition, which is a learning behavior that individuals acquire as members of communities living in one society.

They then made many improvements and divergences to this general definition of the meaning of culture. However, most importantly, everyone agreed that culture is a learning behavior that often contrasts with gifted behavior.[8]

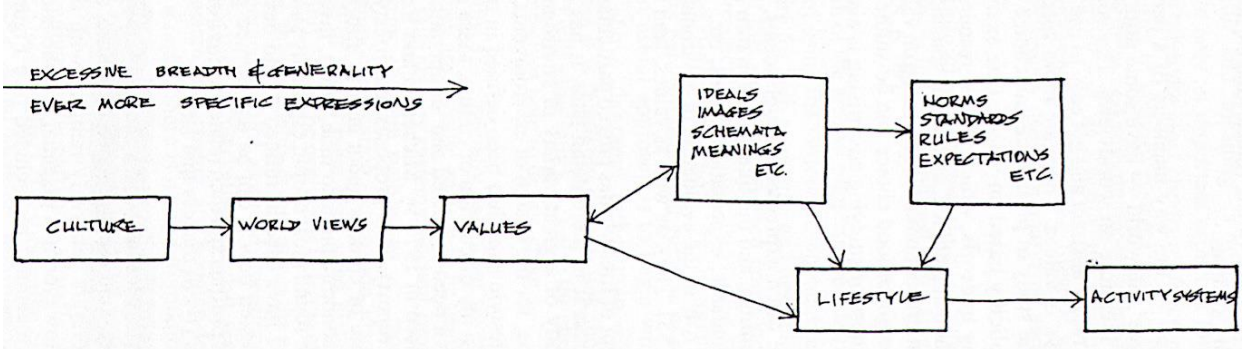


Figure 2 shows the cultural variables according to Rapoport

Culture and Urban Community Behavior.

Traditionally, the culture zone is a common territory where people share similar cultural characteristics, patterns of cultural environment, and similar lifestyles. Cultural attributes include anything that has a physical form, a known function, and a common value in a single cultural group. Cultural patterns of behavior can be categorized as social institutions that possess all means of control

in society and have internal interaction between their members[9]; they are ideological institutions that include the faculty of knowledge and belief in which culture and its means of communication are involved; Rooted attitudes, emotions, and concepts that combine to influence human behavior.
On the contrary, none of these factors works alone; each affects the other factors of the world's cultural institutions such as the institution of religion-which is considered a high influential community variable- community, political and economic systems, and the means by which society tries to maintain internal stability and defend it against real or expected threats. These definitions are confirmed by *George Simel* and *Emilie Durkheim* in their analysis of culture and society[10 ibid].

CULTURAL PATTERNS

Understanding the relationship between residents' culture and the use of urban space is significant during urban development. Some upgrading projects focus only on the physical built conditions and infrastructure, while neglecting the residents themselves. Cultural factors can be dominant in the development strategies of urban spaces. Each "place" has its own character, with their inhabitants' personalities. The development project should consider people's culture, hopes and capabilities[11] . In the present work, a cultural factors matrix is framed and implemented as a checklist for the studied urban space. These factors are summarized as: origin, ethnics, and relation to economy and relation to society as follows:

Origin and life style

In many deteriorated areas in Cairo, groups of the residence originated from different rural regions in Egypt. Each group has their traditional culture, within its original context in the rural villages. For example, the residents of Upper Egypt have their own traditional "sub-culture" and are known for the dignity and pride for their cultural identity, which makes them maintaining their cultural characteristics[12].The residents of Cairo's old districts are strongly attached to their places where they have been living for several decades.

Religion

Egyptian culture is greatly influenced by the two main religions in Egypt: Islam and Christianity. Religion has played an important role in the life of Egyptians throughout history. It has impacted many aspects of their lives, including inherited identity with its norms, traditions and customs. Muslims and Christians share many common values[13].

Relation to urban economy

Economic conditions are impaired by activities, for example, Bad economic conditions in southern governorates in Egypt contribute to the suffering of the residence. People are hard workers and familiar with long work hours for cultivating crops. Those who migrate to work in Cairo usually work as street vendors, or in construction fields. They bring their rural lifestyle with them when they migrate to the city, which is apparent in some of their use patterns of space.

Relation to urban society

The cultural factor is tested by analyzing the area residents' relation to the government, which is represented in the decisions taken by the government for their area [14]. The amount of trust in the state by the residents influences the type of relationship. The state policy and its impact on the urban life of Cairo's residents should be considered. The state's roles were shown throughout many examples taken from daily life of the areas' residents. Residents think they are neglected and deprived because they

are poor. The Egyptian media, especially television, has played several roles in the context of formal/informal relation.

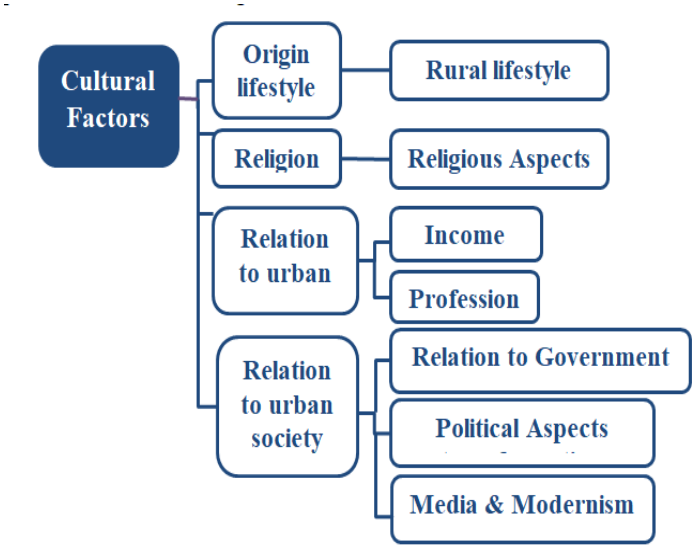


Figure 3 The Cultural Factors

GLOBAL EXPERIENCES OF UPGRADING INFORMAL SETTLEMENTS

This Section shows two examples of upgrading areas in Egypt and Brazil, showing the variable policies used in each project, and to how extend the communities participated in the projects, and finally how the culture of the community had a certain role in Rocinha project.

The upgrading project of *Rockinha*, *Brazil*

Project Name: Development of the Favela de Rocinha, Rio de Janeiro, Brazil
Name of Urban Designer: Jan Kudlicka,2010

The region of Rocinha suffered from lack of services, the lack of proper sanitation in the region as most of the problems of informal areas.The inhabitants of the rural areas migrated to Rochinha in 1930, where they are adjacent to the city of *Rio de Janeiro* to benefit from the services and business available in the area.

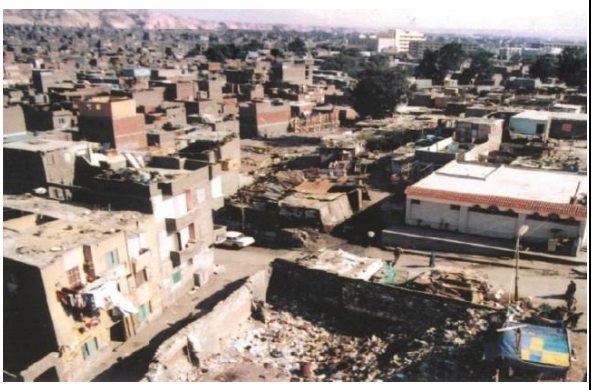
The urban designer studied the inhabitants of the region in many aspects, including the economic, social and cultural aspects to determine the scope of development in the region. He designed spaces between the buildings by using the ground floor to complete the space and compensate the population by building higher floors. The designer created an open cinema, green spaces and bridges between the buildings[15]

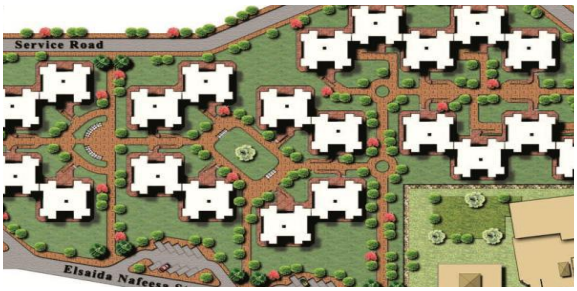
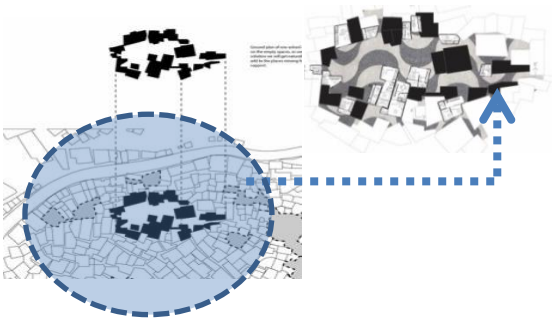
The upgrading of project of *Zenhum , Egypt*

In fact, many of these tents were shelters built by the governorate of Cairo.

The project was adopted by a multi-source funding mechanism, including government agencies and NGOs; Government agencies: represented in Cairo governorate, where they financed the removal of slums and the preparation of the site, estimated at 6 millionE.G.P[16].

Table 1: The comparison between the upgrading of Zenhum area and Rockinha area

	Development of Zenhum area, Sayyeda .Zeinab, Cairo,Egypt	Development of Rocinha area, Reo deGaneiro, Brazil
Before development	 Zenhum area before demolition in the year 1998. Source(Red Crescent,2011)	 Rocinha's area before upgrading in 2009. Source(Vinnitskaya, 2011)
Description	Zenhum's area was a group of deteriorated shacks and some concrete buildings which was deteriorated as well as shown in pic.. In 1999 the entire population reached 20 thousand people which were nearly 4000 families. The total area of the place was about 50 acres.	*Rocinha*'s territory is established in Reo de Ganeiro. Most of the structures were made of concrete and wooden deteriorated shacks appended to the buildings. The populace came to around 250000 out of 1km2 meters. The urban environment was deteriorated.
Policies	The project was initiated by Suzan Mubarak the first lady at that time, thus the government hired the Red Crescent institution to present the developmental studies for the area (Top-Down policy)	The development project was completely dependent on the NGO's which is basically specialized in development projects (Down-top policy)
	Total eviction: All the buildings and shacks were evicted, the total expenditures in the first phase only is about 30 million e.g.p	**Partial eviction:** The whole area was well-studied , then evaluated, thus, only the deteriorated buildings and shacks were evicted.
	Urban Characteristics in the development projects	

Use of Space	 The new design for *Zenhum* development Source:(Red Crecsent 2011)	 The rarefaction procedures of *Rocinha* project Source: (Vinnitskaya, 2011 edited by Author)
	After the eviction, new design was initiated which has no relation with the entire area, thus 4 floors blocks were built and green areas of enclosures were implemented.	The design mainly depended on the rarefaction of the existing buildings to create an open space between the blocks, thus an enclosure and a semi-private space is basically conceived.
New spaces' design	 The figure shows wide unshaded open spaces in *Zenhum* project. Source:(Red Crecsent 2011)	 The figure shows the elevations of the blocks where facades are covered by wooden screens and open spaces are shaded due to the heights. Source: (Vinnitskaya, 2011)
Spaces' Evaluation	Spaces were originally designed and were basically .much wider than needed and not shaded.	The ground floor was actually dumped from the surrounding buildings to generate more space and to widen the spaces in front of the shops.
Cultural and Behavioral attributes in development		
The Identity	The urban design does not express the place identity or the culture of the inhabitants. The area is located in *Sayyeda Zeiab, Cairo*, which is a historical place, thus the implemented	Rocinha's residents didn't feel a distinct change in their place. The same buildings are existing, thus developed. The designer consulted the inhabitants about the colors of their facades and the services .they need around their place

Relation with Urban Economy	 Figure shows the elevations' colors in *Zenhum*. Source:(Red Crecsent 2011) The buildings were mainly used as residential, thus no space was designed to fulfill any commercial activity. Moreover the commercial area was completely far from the project	 Figure shows the variable colors in *Rockinha* Source: (Vinnitskaya, 2011) the main shopping area and the main market was kept as it is, however the community area like cinemas and coffee shops were rebuilt on the roofs .of the blocks
Relation with urban Society	 Open spaces' elements in *Zenhum*, Source:(Red Crecsent 2011) The project didn't locate a place for community gathering like coffee shops which is mostly popular within the Egyptian society and were replaced by a shaded green area which was basically deserted by the inhabitants. Thus the cultural and behavioral attributes were not taken in consideration .	 Roof design in *Rockinha* ,Source: (Vinnitskaya, 2011) As there were no place for the community gathering areas the roofs were utilized to create open cinemas and coffee shops and roofs were connected by bridges. Therefore, new spaces were created and connected within the cultural and behavioral attributes of the community.
Community Life Style	  Source:(Red Crecsent 2011)	   Source: (Vinnitskaya, 2011)

	The choice of colors was due to the consultant and the inhabitants had no relation with this issue. They .didn't choose the implemented colors	The colors implemented in Rocinha were due to the choice of the inhabitants, they also built .wooden screens in front of the existing facades.

RESULTS OF COMPARISON

• The *Rockinha* upgrading project is more successful than *Zenhum* project in terms of cost and also appropriate in terms of the needs and culture of the community, although the *Zenhum* housing project was a well-known as a model for development projects, but did not meet the needs of the community.
• Community participation was actually implemented in *Rockinha* project; as the colors of facades was chosen by the residents, There was also an understanding of their culture, the surfaces were exploited as entertainment areas, cinemas and bridges between the buildings, rather than the allocation of entertainment in the same area.
• The cost was lower in *Rockinha* because the designer did not follow the policy of total eviction - which is highly expensive - and the policy was replaced by the partial eviction of deteriorated and the residents were compensated with higher units(extended floor) in the same place.

RECOMMENDATIONS

• Egypt is currently experiencing chronic economic problems with a deficit in the budgets of the state coincided with the aggravation of the problem of slums, so new solutions are needed to upgrade these areas to ensure the sustainability of development and the absence of urban transgressions after development.
• Understanding the behavior and culture of the community leads to sustainable development where understanding the potentials of the estimated inhabitants and finding solutions coping with their potential, in addition to helping inhabitants to develop themselves and thus increase their income.
• Community participation is one of the most important means of development; to ensure that there are no infringements on newly constructed buildings, and also to enhance the sense of responsibility among the residents of the region.
• One of the biggest problems in dealing with informal areas is the isolation of upgrading policies from the housing market and real estate till nowadays. With some recent efforts to transform policies from dealing with informal areas inhabitants as pariahs, to opportunities by understanding their capabilities, behavior, inclusion and reliance on solutions from the parties involved in the development process from government agencies, donors, the private sector, civil society organizations and charities.
• The problem of developing informal areas is a social problem, and all groups of society, represented by charities and community institutions and not only the government, must unite to solve them.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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VIDEO GAME ENVIRONMENTS AND DEPRESSION: HEALING ASPECTS OF CONTEMPORARY DIGITAL SPACES

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THE TWO EPIDEMICS

The study explores the way in which contemporary video game environments deal with the depressive condition and the design aspects that are employed in order to develop digital and interactive spaces capable of affecting their users on an emotional level.

Widespread digital culture, and especially the prevailing phenomenon of video games, is developing today at such a speed that it can be regarded as a modern type of epidemic. Especially, the new generation, which Marc Prensky aptly called 'digital natives'[1], has grown up, fully familiar with computers, smart phones, tablets, internet use, and generally with new technologies, that encourage the "habitation" of the digital-analog reality. Recent statistic data verify this phenomenon. According to the Entertainment Software Association, the number of players worldwide has exceeded 1,8 billion since 2016, while seven hundred million of them concern web-based games.[2]

At the same moment, this observation is juxtaposed with the phenomenon of depression, one of the most debilitating but also one of the most widespread psychological conditions of the contemporary world. The latest data from the World Health Organization[3] proves that depression is a silent scourge of the modern age, surpassing three hundred million people, according to recent measurements. Interestingly, it is referenced as the "most common type of mental illness"[4], "the leading cause of disability worldwide" as well as "a major contributor to the overall global burden of disease". Additionally, it is strongly linked to suicide, which is the third leading cause of death in youth ages[5].

SPATIAL PROMISES

Early research observations described the use of videogames as capable of provoking a depressive condition. However, recent multidisciplinary studies claim that according to recordings of brain activity in both players and depressed people, video games do not appear as the cause, but as the neurological or psychological counterpart of depression. The importance of playing in the treatment of depression has had many interpretations: "A game is an opportunity to focus our energy, with relentless optimism, at something we're good at (or getting better at) and enjoy." In other words, Jane McGonigal explains "gameplay is the direct emotional opposite of depression."[6]

Excessive engaging in gaming has been referred as a functional "escape mechanism for, or coping with, underlying psychiatric disorders in attempt to alleviate unpleasant feelings, and to calm restless bodies"[7]. At the same moment we have a kind of targeted gamification[8]. Indeed, research has already used video games in order to help people with various disorders such as anxiety, post-traumatic stress, attention deficiency, or paranoia. While, at first sight, most of these games appear to be symptom oriented, one should also mention research on ideas such as "neurogaming"[9] or "electronic medicine"[10] which deal with neuroplasticity and cognitive abilities, while trying to tackle with the brain-origin of a condition. Eddie Martucci describes the aspirations for such a venture "We want this

to be a mainstream option in any doctor's office, right next to Adderall."[11] At the present moment though, it appears that the majority of the games are keeping a salutogenic[12] approach on spatial experience.

In the current study a gamified medicinal condition is investigated through the experience of digital environments in contemporary video games. In the same context, the research focuses on the construction of video game promises, which are otherwise promises of digital realities, that can play an important role in the alleviation of the players' symptoms, and possibly their elimination too. Video games are observed in a double spectrum: firstly, as single case titles of latest video games which manifest a relationship to depressive states through their 'branding' identity or their promotional material and in some cases their research background, and secondly, as a comperative study of larger video game genes, commenting on the behavioural patterns of their gameplay and their relation to clinical or other relating symptomatological characteristics. Alongside an architectural point of view, depressive symptoms are spatially translated and afterwards discussed in the context of contemporary video game environments, therefore resulting in the creation of human experience.

TARGETED DESIGN

Focusing on the case of depression, we can see games that have evolved pointing mainly to the direction of raising awareness about the phenomenon, fighting against the social stigma, or making a depressed person better understand what is happening to himself. More specifically, in cases such as 'Depression quest'[13], the representation of space is mainly textual and literal, as it revolves around the events taking place in the story. The few visuals consist of close ups of objects or details, showing the lack of open or distant view. Metaphorically, the whole story shows a space that is narrowing down - the options of the depressed diminish over time, and similarly the game options fall off. The game controls generally feel heavy and stodgy, almost dysfunctional, just like the experience of the depressive condition. Space in a representative form is almost inexistent in this game – which can be translated as the depressed being distant from his surroundings.

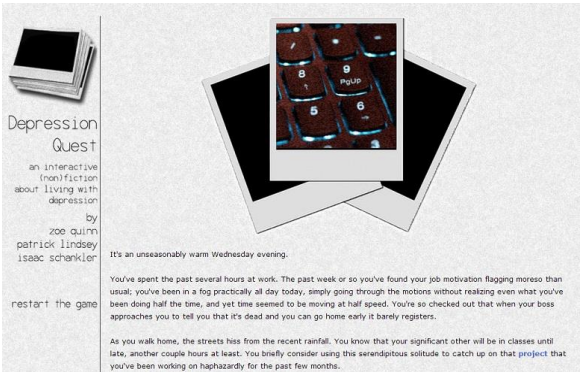

Figure 1. Screenshot from "Depression quest". http://www.depressionquest.com

In video game 'Actual sunlight'[14] – the player attempts to prevent Evan Winter from ending his own life (the name Winter makes an interesting association with that season of the year during which there is a high peak in depression episodes). The game represents the spaces in which Evan's life is taking place, a dull and disorganized house, which follows the dysfunctionality and dereliction of its owner's body and self. Various momentary changes of perspective that rarely appear on the screen, reveal visual details such as a bath mirror that is long broken, rain falling, or Evan lying on the bed for hours. The spatial representation is reflecting an inert state of rumination. The same spaces are alternating, expressing a sense of stillness, inertia, or in other words, a difficulty to change. One of the difficulties of depression is the feeling that you cannot 'move', evolve, change, proceed. The story script mentions

"every night you think tomorrow is the day you are going to do it"[15]. The character moves in spaces that are represented in the form of ground floor plans, totally detached from the outer world, surrounded by total blackness. The depressed is at an introvert state, is submerging into oneself, and feels unable to interact with others or with the world.

The same spatial approach appears to the game 'Please knock on my door'[16], a similarly represented narrative through ground floor views of the house of the protagonist (a shadowy abstract figure) who also suffers from depression. The house manifests neglection and repetition of everyday mundane experiences. The whole world of this depressed hero is that intimate space of his house, through which the inner landscapes of his soul are projected. The depressed sinks in his house in the same way he is submerged into his mental state. The only case the camera's symbolic perspective changes, is when he looks out of his window.

Figure 2. Screenshot from "Please knock on my door". http://pleaseknockgame.com/

In both games, the use of floor plan views, is interestingly offering a point of view which can be rethought in terms of treatment. The player can observe the situation, from a distance, from above, from another point of view which gives the opportunity to evaluate things, actions, relationships. Seeing things from above also offers a sense of a superhuman power, giving at the same time a feeling of control over one's own life, one of the most fundamental action-steps against depression.

In video game 'Elude'[17], we have the representation of depression as an emotional landscape, where "happiness remains elusive". The word 'Elude' is referred as relating to Latin word 'e-ludere' meaning 'away from' and it is also deriving from the word 'ludo' meaning 'to play' and 'to trick.'[18] In a lethargic, catatonic world, the player is asked to find interest in things through 'resonating', things that he can enjoy, so that they can make him jump higher. In this case spatial organization is based on the concept of ascent and descent. Since depression is often described through the metaphor of going downwards, the game asks the player to move upwards towards the top of the trees where happiness lies. The player often falls and has to climb up repeatedly. The idea of moving in space on a vertical axis has a distinct use as a design tool for emotional impact, since the body's ability to move on this axis is restricted. Especially, if the body moves downwards, it is crushed on the ground, reminding us of the etymology of 'depression'[19]. Besides, the descent, symbolically, refers to the direction opposite from the sky (from where the light comes), which verifies the 'darkness' that often characterizes melancholic space, one of its most common metaphors.

Figure 3. Screenshot from "Elude". http://gambit.mit.edu/loadgame/elude.php

In the game 'Inner vision'[20] a space of dialogue is represented. The player talks to a series of people trying to prevent them from suiciding, seeing only what the light allows him to see, but never seeing himself represented other than in the form of a series of thoughts. Every figure is surrounded by dark space, as if this darkness is cutting the depressed off from the rest of the world. Surrounding space here is also a sort of empty or even inexistent, reminding of the way the depressed subject withdraws into himself.

In other games such as such as 'Sparx'[21], 'Project Evo'[22], 'Personal Zen'[23] or 'Superbetter'[24] the player is asked to focus into things that are loved, precious and inspiring, or into things that give motivation to act. Thus, they have been approached as effective therapeutic tools. Some of them also use imaginary landscapes with many references to the beneficial for their health natural environment in order to evolve their gameplay.

THE USE OF DIPOLES

However, one can observe that there are narratives in video games generally, that deal with some of the aforementioned spatialities, such as the experiential dipoles of light and darkness, flow and dysfunctionality, or ascent and descent in a different way. For example, in the game 'Child of light'[25] the player defies the powers of darkness, or in the game 'Where Shadows Slumber'[26] he becomes the light himself, (when he moves, the light moves). Also, in the game 'Luxuria Superbia'[27], the player defies emptiness and colorlessness, bringing a colorful tunnel to life in a process which resembles to meditating.

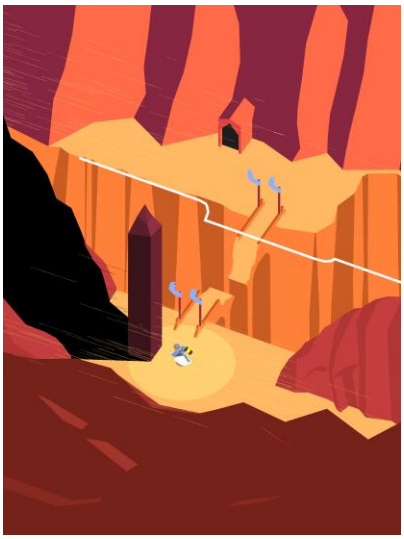

Figure 4. Screenshot from "Where Shadows Slumber". http://www.whereshadowsslumber.com/

In terms of flow and dysfunctionality, in games like 'Journey'[28] and 'Flower'[29], the player experiences a deeply emotional process of exploration and travelling, almost flowing freely in digital environments that evoke awe and wonder, leaving the player with a really positive experience. The game 'Proteus'[30] allows for the sublime of nature to trigger feelings that linger even after gameplay. Some other games such as 'Braid'[31] offer time manipulation mechanics which are very interesting in this context, since the depressed subject suffers from a distorted temporality, inhabiting anywhere else than the present, or even inhabiting an eternal pause.
Considering the dipole of ascent and descent, in games such as 'Undertale'[32] the player tries to return from the Underground to the surface of Earth, or in 'Alto's Adventure'[33] (in 'zen' mode), the player can enjoy a mountain descent without fear and sometimes without obstacles. Also, In the game 'Thomas was alone'[34] there is an interesting comment on the idea of 'falling'… "Thomas was absolutely fantastic at falling", which is reversed when finding an obstacle: "what if there was some kind of inverted fall – some way to 'jump'"[35]?

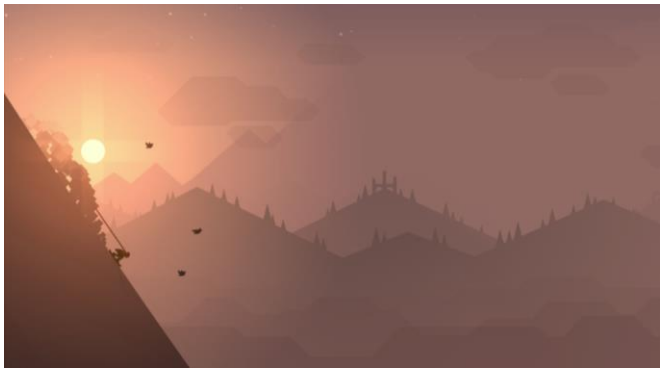

Figure 5. Screenshot from "Alto's Adventure". http://altosadventure.com/

IMPLEMENTATION OF GAME ELEMENTS

Therefore, does a video game really have to be specially designed or targeted to a mental condition in order to offer a therapeutic effect? After observing videogames that have been designed in the context of depression and juxtaposing them with other entertainment games with similar spatial characteristics, one can realize that it might be possible to locate game elements, mechanisms or other general features relating to video gaming that can be implemented in design in such a way that, when used in a specific context and from specific users, they can contribute to the alleviation of symptoms, or to the therapeutic process itself. Or, contrariwise, from a salutogenic point of view, they can promote the well-being of every individual subject irrespectively of the concept of a specific target group.
This statement lies initially in the video game phenomenon itself. Video games make use of elements deriving from art, music, film and literature, mediums that have been long used for inspiration, emotional stimulation or representation of inner mental states, since antiquity. Director Guillermo del Toro describes, "I think video games are going to completely take over storytelling in our society."[36] – Video games offer motivation, a desire to act immediately, while keeping being inspired through the way. The actions of the player are constantly rewarded, and the player feels a desire to focus, to master the game, to direct it, or to gain control of it. But the most important of all, there is a preceding desire to enter into this other fictional world, "the narrative is finally subjectified"[37], a step that has been described as a form of escapism, but which, in another context, can be used as an exploration of a better, stronger and more positive version of the player's self.

FROM TYPES OF SPACE TO TYPES OF EXPERIENCE

"Realization of space is a quite wide 'mindful' operational game of questions and responses about the architectural meanings"[38], and therefore of the respective design practices in video game contexts. Thus, if we look at game genres or typologies, we realize that they offer differentiated qualities of experience that can be used respectfully.

For example, Massively Multiplayer Online Role-Playing Games can promote social interaction and trust while experiencing common narratives, spaces, or events. First-person Shooters, can increase motivation and participation through competitiveness, through constant goal-setting and reward which is referred as affecting the way of thinking of the individual over time. Casual Games, can also stimulate the mind, while offering a generally improved mood which is alleviated from stress or anxiety through repetitive representation motifs, problem-solving and focusing. Specifically, solving puzzle games, makes an interesting contradiction with the dysfunctionality of the depressive condition. Running or platform games, overcome this sense of dysfunctionality through an experience of flow which contrasts the feeling of an eternal pause in which the depressed subject finds himself. Virtual Reality Gaming that represents serene or inspiring environments can also affect the player's mood through this multisensory spatial immersion that it offers. Video games with a strong narrative, such as games with character simulation, work impressively on depression, as the subject can explore his fears, face situations, or reestablish connections with his own life. Additionally, in roguelike games that the player experiences a permanent death, the individual can learn to cope with repetitive failure turning it into an accompanying feeling of achievement which offers meaning to the overall experience. Pet-simulation or even farm simulation video games encourage the depressed to overcome any lack of interest or feelings of neglect and return to the present through the inhabitation of this other environment. Location-based Augmented Reality Games encourage the player to reverse introversion by getting up and exploring the outside world. Or, in videogames where motion capture is implemented, the player's mood is radically affected by a more body-centric approach, in which the lethargic body becomes an active participant, transforming into an instrument of spatial experience one of the most fundamental qualities of the treatment of depression.

THE NEED FOR A NEW 'READING'

Concluding, videogames manifest an ideal context for players to reconcile with the notions of "obstacle", "difficulty", or distant "goal", since these often constitute the backbone of the gameplay's structure as well as the gamers source of motivation and satisfaction. More specifically, video game environments that deal with depression provoke healing, alleviate symptoms, and encourage a deeper understanding of an intimate human condition through alternative approaches of the ways people experience and inhabit digital environments. However, one can realize that such specialized games are limited, and those already existing hardly make use of the spatial connotations that prove to have helpful associations with the treatment of depression.

The need for a new "reading" of the depressive condition arises, making use of this feedback - a new translation, which derives from the observation of a fundamental human need: firstly, to spatialize symptoms, in order to fully understand or communicate them to the outer world - the description of psychological conditions always proceeds with notions of space expressed mentally - and secondly, to experience or converse with it through a metaphoric realm - fictional game worlds form an ideal narrative mechanism for metaphoric schemata to take place. This means a series of spatial elements that can be implemented in the process of designing digital or interactive environments, either in therapy-oriented or even in entertainment video games.

It is important to note that the new generation which is growing up with video games spends billions of hours in these digital environments, and this is exactly what makes them so promising in terms of

promoting health and wellbeing. Marc Wigley mentions that by choosing a video game, we choose an architecture[39]. In a similar sense, during gaming, we choose an 'experience', which always implies a way of 'being'. We consume spaces and versions of ourselves in video games - and at that exact point lies the potential of a player's confrontation with the depressive condition - space informs experience and consequently renders the mental state of oneself.

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HOMES FOR ALL – CONNECTING THE BUILT ENVIRONMENT TO HEALTH IN AUSTRALIA

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INTRODUCTION

Australia is in the midst of a housing crisis. This takes a number of different forms, but its various dimensions impact on the health and wellbeing of its citizens in profound ways. There are serious affordability problems for those trying to purchase or rent housing, a rising tide of homelessness, social-spatial polarisation, the rapid development of inner and outer areas of our cities well before the provision of appropriate physical and social infrastructure and housing as well as urban designs that do not cater for our diverse and ageing population. While well identified, the many studies and policy interventions to address these issues are often limited by their single disciplinary or top-down orientation. To address this challenge, a group of Deakin University academics came together to think and work differently on these issues. The research network "HOME" was the result. This paper will briefly discuss our understanding of the relationship between housing and health, before describing HOME and elaborating on two aspects of the Australian housing crisis through cases studies on one outer suburban community and in universal design. In the process, the power and benefits of interdisciplinary research which is strongly connected to communities will be illustrated. So too will the benefits of seeing the connection between health and the built environment in new ways.

HOUSING AND HEALTH

According to the World Health Organisation, housing is fundamental to physical, mental and social well-being and quality of life. In discussing the relationship between housing and health it is important to clearly define what we mean by housing. Bonnefoy's framework (Figure 1)[1] is useful in this respect. This describes four dimensions of housing taking into consideration the physical structure of the dwelling, as well as the meaning of home, the external dimension of the immediate housing environment, and sense of community. Indirect and direct health effects can occur at each level of this framework. For example, security of tenure affects one's meaning of home and mental health, inappropriate dwelling conditions such as the use of unsafe building materials can result in injury or even death, levels of social cohesion can affect perceptions of safety and psychosocial health while poorly designed neighbourhoods can limit physical activity[1]. Thus, housing and its impacts on health reach beyond the mere physical structure of a home.

Figure 1. The four dimensions of housing and framework[1]

THE AUSTRALIAN HOUSING CRISIS

The popular press, researchers and the HOME group have isolated seven major housing issues in contemporary Australia. Many are interrelated and all in different ways impact health and well-being. They are:

1. "Suburban sprawl" and related social and environmental costs
2. Demographic change and housing – ageing and increasingly diverse household forms
3. Housing affordability
4. Affordable or social housing
5. Homelessness
6. Densification of our major cities and the impact on liveability, especially for families
7. Socio-spatial polarisation across cities undergoing economic restructuring

HOME

Currently, the main solution to the crisis appears to be building cheap, poorly designed houses detached from jobs and facilities on the low-cost land edging our cities. Clearly, better alternatives are needed. Australia requires long-horizon solutions to these problems, which:

- improve existing housing stock;
- develop innovative models to integrate well-designed new developments; and
- facilitate social inclusion and housing adaptability.

In short, the issue is about more than housing, it is about Home.

HOME is a group of 25 researchers from across the disciplines of public health, occupational therapy, disability studies, human geography, anthropology, law, finance, architecture and urban design at Deakin University in Melbourne/Geelong Australia. They came together in a commitment to understanding and ameliorating the Australian *home* crisis.

HOME has a single core aim: A Home for all. The research group focuses on four themes:

- Home for life: designed to be adaptable and universally accessible, meeting our various needs, enabling us to engage in personally meaningful activities, safe and securely ours, and so home for all stages of life;
- Home we can afford: designed to minimise energy use, constructed to minimise negative environmental and health impacts, matching our means, available to all, and so home that is sustainable collectively and individually;

- Home where we know neighbours: designed for social connectivity, encompassing diversity, and so a home where we can strengthen relationships across difference;
- Home that is connected: linked to occupations, services, education, nature, transport, play, food, and to the wider community.

HOME looks beyond the remit of other national research groups through: regional and local government connection and focus, broadening urban research to include a far wider range of disciplines, connecting spatial and built environment issues with health and well-being, and combining bottom-up as well as top-down approaches to directing change. The analysis and development of alternatives to these issues needs to go beyond existing approaches to take in economics, public policy, social geography, design, law, finance and health; disciplines that are all present in the HOME group. But HOME is not only distinguished by its interdisciplinarity and action orientation. For these major issues have macro causes and effects, but also, perhaps more importantly for those effected, local causes - not only of sprawl, but affordability, social connection, appropriate design - and impacts. And it is at the level of households and communities that the HOME group develops and refines research problems, conducts grounded enquiries and collaboratively develops local solutions to enhance health and wellbeing. To illustrate we present two of our projects; one concerned with the experiences of living in one of Australia's fastest growing outer suburbs and the other focused on how we might produce better buildings and neighbourhoods universally designed to meet the health and well-being needs of our increasingly diverse population.

HOME CASE STUDY 1: BUILDING BETTER SUBURBS

Introducing the outer suburbs

The Australian suburb has a very long history, being part of the very first plans for Sydney. Over the 19th century, suburban living became more available and desirable, firstly for the wealthy and increasingly for workers. Embraced by the majority in the 19th century, by the early 21st century, over 70% of the Australian population was housed in detached housing, mostly in suburbs[2]. The outer suburbs on the peri urban boundary of all Australian major cities provide relatively cheap land for building larger, low density housing compared to established suburban areas. As such they are popular residential locations, especially for Australian families raising children[3]. However, the outer suburbs are not without their problems. Reports highlight the growing spatial divide between inner and outer suburbs of Australian cities such as Melbourne, in terms of: service provision, employment, availability of public transport and social disadvantage[4], along with concerns about these areas not promoting good public health outcomes as a result of car dependency, and fewer opportunities for social interaction[5].

The case study was located in one of the fastest growing outer suburban municipalities in Australia, located approximately 35 km from the CBD of Melbourne. The research was initiated by the local government who were interested in trying to develop 'better suburbs' that provided more healthy, productive alternatives to current outer suburban design.

The first stage of this project collated academic literature and distilled from it principles and approaches which might inform the development of a model suburb. In the second stage we used resident driven photo-elicited interviews to identify what was working and not working in the municipality[6]. Three major themes were identified; place-making, mobility and community building[7,8,9]. This case study overviews some of the specific findings highlighting the intersection between the built environment and health.

Building a sense of community

Social connections are important for health1[10]. Place-making is one way in which to foster social connectedness. Participants in our study reported a number of developer-driven activities that initially appeared to connect people but ultimately were not sustained and in one case had negative health implications. A children's playground known as the Pirate Park was one such example. Participant 5 explained:

> 'It was a huge park… apparently people used to come from all over Melbourne to it. When they first built it they had to close the slide because kids actually came off it and broke their arm, broke their leg… and then they started having security at night so people would be safe… I do know someone committed suicide up there as well and a few other issues as well. So even though it was a really good park and everyone came to it there were other issues to it.'

Ultimately, the wooden ship part of the park was burned to the ground. Despite its former iconic status, when Council organised a meeting to plan the rebuilding of the park, hardly anyone attended and it fell into disrepair.

In contrast, built form that was more grounded in the needs of the community was recognised and celebrated as offering more sustainable opportunities for connecting a growing and diverse community. Participant 3 photographed the local library (Figure 2) and explained:

> 'Okay this was just a shot of outside the library. I took it because it's got the bike racks which are covered in the yarn bombing… in my experience the library is a place where a lot of different cultural groups seem to meet up and congregate, I think there's lessons in English and they often celebrate different cultural activities… so it has an important role, I'd say, within our community because it's quite a diverse community in terms of different backgrounds and the kids go there and, I think it's pretty cool that people can cycle there.' (P3)

Figure 2. 'The library – awesome community space'

Other positive examples that connected residents were sports centres, community centres, local markets and interesting virtual meeting places such as residents Facebook pages.

Work/life balance

Being able to balance working hours with family and leisure is a growing public health concern in Australia[11]. Commuting time is increasing and is particularly problematic in the outer suburbs[12]. Long commutes were the norm in our study. A major component of this related to the design of the suburb with only one road connecting the suburb to the freeway. For example, P7 explained:

> 'To get out of the suburb takes forever, my husband, might spend an hour in the car on the way to work in the morning to go 22 km so that's the reason, I'm going to entitle that [my photo Figure 3] 'Gridlock'.

Figure 3. 'Gridlock'

This had health implications for families and individuals:

> 'People are travelling, two, two and a half hours a day, that's two and a half hours away from their family.' (P10)
>
> 'People's frustrations with the traffic make them do stupid things on the road which makes it unsafe.' (P6)

The Victorian State government is currently attempting to promote local employment to reduce commuting however, the employment opportunities provided in the suburb were often inappropriate, meaning residents had to take matters into their own hands. For example, Participant 6 described how local businesses had transformed a new, unused, industrial estate:

> 'It's become an employment growth area,… there's a pub, two ten pin bowling centres, a martial arts gym, it's being used for a purpose that it wasn't originally intended for and I think it's part of this culture and the spirit in which this suburb is evolving, it's doing things on its own... so let's just occupy this industrial area and turn it into what we want.'

Other examples included residents designing elaborate alternative commuting routes, running small businesses from their own homes or interestingly renting a second house locally from which to run a business.

Summary Findings and future research

Our study identified a number of policy and planning issues that need to be addressed to improve the liveability of the suburb. The case studies highlight succinctly how trying to address issues in silos leads to problems, it is clear that cross disciplinary approaches are required. Our research also suggests policy makers, planners and developers should pay more attention to the needs of and solutions designed by residents in seeking to build 'better' suburbs.

HOME CASE STUDY 2: EVALUATING UNIVERSAL DESIGN IN THE BUILT ENVIRONMENT

Introducing Universal Design

The term Universal Design (UD) was first used in 1985 by Mace, who with a team of architects, product designers, engineers, and environmental design researchers developed seven principles of UD. The principles are reflected in the commonly accepted definition of UD as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" [13]. Whilst the principles have been useful in assisting to define UD, they have been criticised, for it is recognised that they cannot be evaluated or benchmarked and that there is a lack of a body evidence behind each of the principles. Recognising the many criticisms of the principles of UD, their authors developed the Goals of UD.

Policy makers are increasingly demanding that UD should be applied to the design of built environments. However, it is not known how key stakeholders involved in the design of built environments understand this term or where they have acquired their understanding. Nor is it presently clear how the concept of UD should be applied during the design process, nor how the UD qualities of buildings might be evaluated.

Regarding how best to evaluate UD, no study has previously examined the opinions of the people that work in building design, policy makers, academics in UD or people of varying abilities that use buildings. HOME's UD research addressed this gap by collecting data from a range of stakeholders – industry professionals, policy makers, government officials, academics and building users, including people who experience disability.

Team

The UD research team spans the disciplines required for in-depth understanding of issues pertaining to built environment design for inclusion and disability – a partnership between the School of Architecture and Built Environment and the School of Health and Social Development[14]. The team are all members of HOME, and also collaborate via joint teaching programs that enable occupational therapy and architecture students to work together towards the design of buildings that better incorporated the principles of UD.

Method

The first stage of the project completed a literature review and web-based audit of existing tools and methods to evaluate UD. The project then developed an electronic survey to gather data on people's understanding and knowledge relating to UD and its application to the built environment. The survey, comprised of a combination of numeric scales and open-ended questions, was promoted via professional websites, email and social media to professional practitioners, peak industry bodies, policy makers, expert users and academics.

The survey was completed by 157 participants. The majority, 87%, were working in Australia. Gender distribution was relatively even, with 52% female. When asked to report their occupation, participants

identified most frequently as an Academic / Researcher (n=39), Access Consultant (n=27), Architect (n=22), Disability Advocate/Representative (n = 21) and Occupational Therapist (n = 18). Over half had personal experience of disability that influences their access to the built environment either via their own experience or via the experience of a family member/close friend who has a disability. The majority of interview participants had extensive experience working in the built environment, with the highest number of participants (n=8) indicating they had done this for 21-30 years.

Summary findings and future research

The finding that survey participants rated their knowledge of applying UD as higher than their theoretical knowledge on the principles of goals of UD prompts the key question - what knowledge where they 'applying' if it was not the principles and goals? Elucidation is provided in the criteria participants stated they would use to rate the UD of a building. For the vast majority of 800 suggestions referred to building elements that could be grouped into thirty-two categories – such as equitable use, entry door accessibility, or legible signage. Only a small number responded to the UD principles, and none to the goals.

Semi-structured interview with experts are exploring experiences and opinions of evaluating UD in more depth. Quantitative analysis will also consider in detail if the principles align with the goals and how both relate to the 32 elements of a building. This quantitative data will inform an evaluation tool for the application of UD that will be refined via testing by expert users on 10 public buildings in Melbourne. Factor analysis of data from the use of the tool will be use to inform a simplified tool that aims to make it possible for users of all physical ability to quickly evaluate the UD credentials of public spaces and buildings. HOME will then utilise this expertise to inform the better design of housing. Ultimately, the team hope to use the tool to establish a national database of UD evaluation (via citizen science project) and evaluate the data to inform national UD policy for the built environment.

CONCLUSION

In conclusion, our paper has outlined the main components of Australia's housing crisis and the need to take a more holistic approach in designing solutions to tackle these. We describe the formation and vision of the transdisciplinary research hub HOME, based at Deakin University in Australia and our vision of a HOME for all; research that connects spatial and built environment issues with health and well-being, and combines bottom-up as well as top-down approaches to directing change. Through two case study examples we highlight how researchers from HOME have worked on small scale projects. Our future work will build on these examples, working with the NGOs and government to help design healthier built environments in Australia.

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AN INVESTIGATION OF THE IMPACT OF FLOOD DEFENCES ON UK RESIDENTIAL HOUSE PRICES

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INTRODUCTION

The UK has always experienced flooding, and during the 20th and 21st century numerous flood events caused momentous damage to the state and value of property, occasionally causing loss of life. 1

The detrimental impact of flooding in the UK has heightened due to the increase in frequency of flood events, in turn causing mental and physical health problems, damage to infrastructure and in relation to this study damage to residential property and their values. 2

The damaging effect of flood events on residential property has called for the construction of large-scale flood defence schemes that have been put in place not just to protect the physical state of dwellings, but have also been assumed to improve and protect residential property values. 3

Therefore, it's important to consider the existing situation regarding the relationship between flood defences and residential property values, where it is of significance not only to homeowners and their representative agents, but also to local and national governments.

There has been a lack of studies in the UK relating to flood impact on property values where studies have shown a limited and largely temporary impact of flood events. 4

However, the research has not provided significant and sufficient evidence to determine how the impact of flooding on residential values can be mitigated by structural approaches. Consequently, the following research study aims to explore whether new provision of flood defences can help maintain or boost values of residential property situated in floodplains.

Therefore, the research aims to determine whether effective flood defences, employed by national and local governments and the Environment Agency, can help maintain or improve market values of residential property situated in a floodplain and protected by flood defences through answering the question:

Can effective flood defences help maintain or boost UK residential property values in flood protected areas?

LITERATURE REVIEW

Unlike other flood related issues such as the effects of flooding on property values and buildings and contents insurance, the relationship between flood defences and residential property values is an issue subject to little existing literature and research.

The increase in prevalence and severity of flood events over the last two decades has called for effective responses from various government institutions across the globe to act upon the current issue.5 In the UK, the Department for Environment, Food and Rural Affairs (DEFRA) are the designated lead for flood and coastal erosion risk management in England and Wales. 6

According to the ABI statement of principles, implemented flood defences will increase accessibility and affordability of buildings and contents insurance for homeowners.[7] This in turn protects the physical state of properties and may boost their values.[8] However, Susnik argues that flood risk mitigation through PLFRA is more effective.[9]
While this provides evidence that flood defences can help protect homes, there is limited evidence to whether defences maintain or increase residential property values situated in flood-risk areas.

Hypothetical profiles of flood impact on residential property values

Regarding existing literature exploring flood impact on property values over time, Tobin and Montz investigated this issue.[10] As well as presenting hypothetical profiles for property values impacted by flooding, diverse charts of land values are presented which are all influenced by time, occurrence and severity. They both conclude that numerous environmental and socio-economic characteristics, in addition to the flood features, all heavily dictate the retrieval and speed of the recovery in value of residential dwellings.
Lamond and Proverbs after Tobin and Montz' study produced basic characterised profiles, which consecutively forms a range of scenarios of the impact of flooding on residential property prices over time.[11] Figure 1 displays a basic flood impact profile, where property prices initially depress after the flood event, but overtime the prices eventually recover to their original values.[12] They state that this profile is likely to be seen in a flash flood event which has occurred in a low flood risk area, where there is a short period before the prices recover after the event, potentially as small as the reinstatement period of the damaged properties.

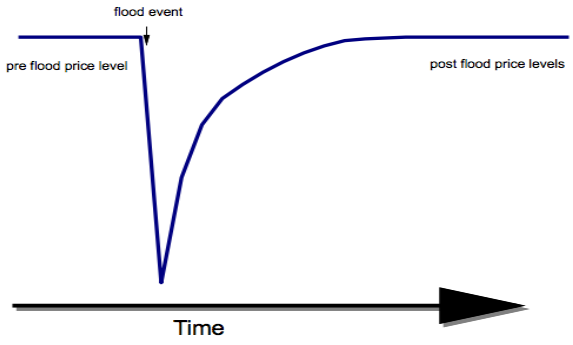

Figure 1. Hypothetical impact of a flood event on residential property prices.

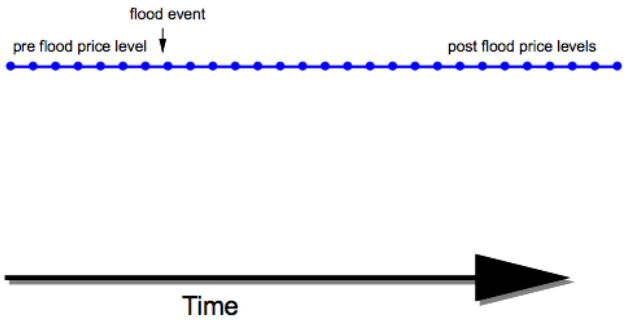

Figure 2. Flood impact on a high flood risk area.

Figure 2 shows a theoretical profile where a flood impact has occurred in an area which is prone to flooding, where it is already capitalised into residential property prices.[13] Therefore, no effect on house prices is present after a flood event, where this profile could also be seen in an area where buildings and contents insurance is obligatory within residential dwellings.
Figure 3 shows the profile of this effect on house prices, where this is likely to happen if the flood effects the likelihood and affordability of house insurance, which can in turn cause financial implications for potential buyers. [14] Consequently, house price levels can drop and are never able to fully recover after a flood event.

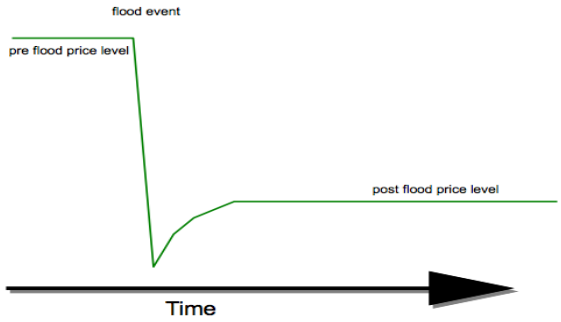

Figure 3. Flood impact capitalising residential property prices.

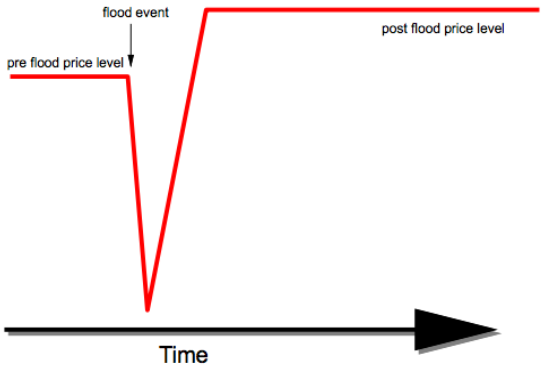

Figure 4. Improvement of house prices after a flood event.

Although figure 4 could be perceived as being unreasonable, this profile has occurred in rare occasions. [15] This profile is likely to occur if the flooded properties experience an increase in building standards surpassing the original buildings specifications. In addition to this, if flood defences are improved or installed after a flood event this can also contribute to the formation of this profile, where house values exceed their pre-flooded values overtime. [16] However, other aspects contributing to the result of this profile may be more significant such as strong growth of the general residential market.
Considering these theoretical profiles, produced by Lamond and Proverbs stemming from existing international literature, they suggest that the effect on house prices caused by flooding overtime vary. [17] These effects are dependent on various local circumstances, where the different profiles could support the prediction of flood effects on house prices overtime for specific flood events in the future.

RESEARCH METHODOLOGY

This research sought to quantitatively and qualitatively assess if there is any indication of a positive or negative correlation between residential property values and flood defences, based on a specific case study in the UK.

Market values have been evaluated by using transaction data from secondary data sources and expert opinion was sought from local property practitioners. The objectives also included the need to explore the market dynamics with respect to timing of changes in value to residential property in relation to flood defences.

The case study selected was Bewdley in the UK as it had a suitable chronology of flooding and the implementation of defences over more than a decade. Bewdley is an attractive town based in Worcestershire, situated on the banks of the River Severn famous for its picture postcard quality and riverside vistas.

Quantitative data

The land registry was used by the researcher to collect the following data on sales of houses in Bewdley over time. In order for the researcher to effectively answer the central research question of whether flood defences can help increase residential property values, house price data was collected in different time periods pre-flood defence instalment and post-flood defence instalment.

Due to the severity of the Autumn 2000 flood event and relation to Bewdley's residential market, house prices were collected pre-flood (01/1995 – 10/2000), post-flood (01/2001 – 12/2003), pre-defence (01/2004 – 03/2006) and post-defence (03/2006 – 12/2008).

The residential property values were obtained by using transactional data through secondary quantitative data sources. The values of residential property obtained in the research study were only taken from dwellings where:

- They are subject to the protection of the flood defence in Bewdley (Taken from the Environment Agency flood risk map);
- Residential properties situated in in the floodplain, but are not subject to the protection of a flood defence (acting as a control);
- Residential properties situated outside the floodplain in Bewdley (acting as comparison group).

The Land Registry has been the main secondary quantitative data source which has been utilised. This form of research gave the researcher scope for data analysis, where the empirical based patterns can be compared to previous findings or predicted patterns. [18]

Qualitative data

Interviews were the primary source of qualitative data as they supply reliable and comprehensive information for the researcher to analyse.[19] Interviews gave the researcher a face-to-face interactive situation where the respondents gave detailed answers relating to the central research question.[20]

Hence, semi-structured interviews, regarding the relationship between various flood defences and property values, also exploring other relevant issues regarding flooding, was carried out with the two major estate agencies in Bewdley.

CASE STUDY

An analysis of data for the town of Bewdley, situated in the West Midlands, was executed using the Land Registry and Environment Agency flood map data.

Bewdley flood history

Bewdley is highly vulnerable to flooding; the largest flood event recorded was 5.8 metres above average summer levels in 1947. Due to the increase in urban development over the centuries along the river frontage into the low-lying floodplain, the natural runoff area for the river during high levels, many buildings are at constant risk of flooding. [21]

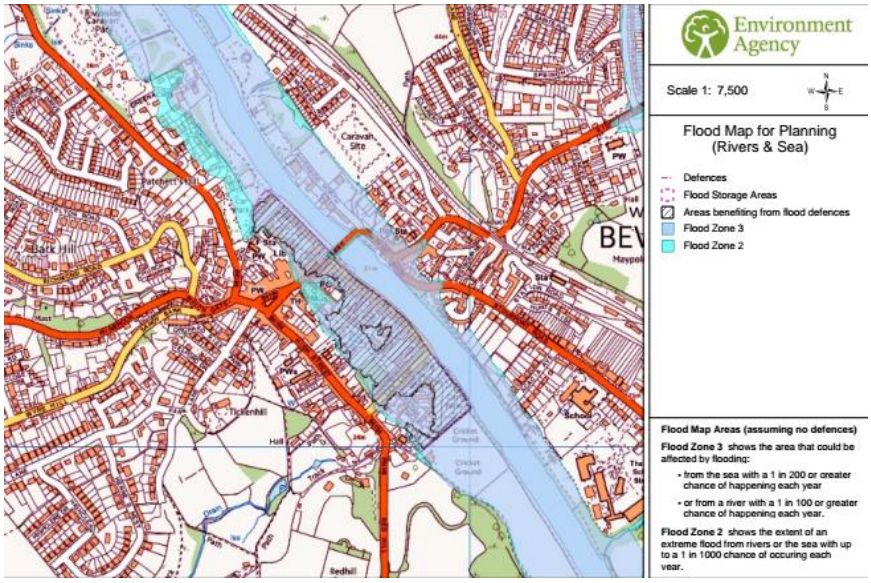

Figure 5. Flood map for planning (rivers and sea) centres on Bewdley.

Bewdley flood defence

After extensive consultations with a variety of organisations, groups and individuals, it was decided that the construction of flood defences within the town was the only economically and environmentally viable option. [22]

The chosen option comprised a combination of demountable defences, embankments and flood walls along the river – the demountable defences only being erected when Bewdley is forecasted for flooding. The scheme was completed in March 2006 eventually being subject to the protection of 175 properties – in total costing £11 million. [23]

Number of properties protected from a 100 year flood event:	175
Total cost of scheme:	£11 million
Scheme commenced:	December 2001
Scheme completed:	March 2006
Length of 'demountable' flood defences:	630 metres
Length of permanent, brick faced flood defences:	200 metres
Number of posts:	211
Number of planks:	2,500
Time required to erect 'demountable' defences:	11 hours
Design consultants:	Halcrow Group Ltd & W S Atkins Consultants Ltd
Main contractors:	Birse Civils Ltd & Volker Stevin Ltd
'Demountable' defences supplied by:	Bauer Inner City Ltd

Figure 6. Bewdley flood defence scheme – key facts.

Results

The samples extracted of property transactions over the selected time periods (as described in the methods section) is shown in tables 2, 3 and 4. The average prices are shown for properties inside the protected area (table 2), inside the floodplain but outside the protected area (table 3) and outside the floodplain (table 4). Figures 7 and 8 show the average house prices in Wyre Forest from 1995 to 2008 and the percentage monthly change in Wyre Forest respectively.

Table 2: Average price (£000) of residential properties inside the flood protected area over time

Key: O = Observations V = Average value (£000)

Property type	**No. of *O* from 1995-2000**	***V***	**No. of *O* from 2001-2003**	***V***	**No. of *O* from 2004-2006**	***V***	**No. of *O* from 2006-2008**	***V***	**Total No. of *O***
All	59	**86**	19	**138** (+60.5%)	26	**178** (+30%)	42	**197** (+10.7%)	146
Detached	15	**139**	4	**235**	4	**270**	6	**320**	29
Semi	9	**73**	2	**84**	2	**171**	4	**170**	17
Terraced	27	**70**	9	**128**	9	**160**	19	**164**	64
Flat	8	**63**	4	**103**	11	**111**	13	**136**	36

Table 3: Average price (£000) of residential properties in the floodplain, but outside the flood protected area overtime

Key: O = Observations V = Average value (£000)

Property type	**No. of *O* from 1995-2000**	***V***	**No. of *O* from 2001-2003**	***V***	**No. of *O* from 2004-2006**	***V***	**No. of *O* from 2006-2008**	***V***	**Total No. of *O***
All	79	**87**	55	**155** (+78.2%)	36	**225** (+45.2%)	32	**188** (-16.4%)	202
Detached	14	**101**	9	**211**	10	**298**	7	**231**	40
Semi	26	**89**	22	**99**	8	**189**	7	**189**	63
Terraced	35	**88**	24	**155**	18	**189**	16	**213**	93
Flat	4	**69**	0	**N/A**	0	**N/A**	2	**120**	6

Table 4: Average price of residential properties outside the floodplain

Key: O = Observations V = Average value (£000)

Property type	**No. of *O* from 1995-2000**	***V***	**No. of *O* from 2001-2003**	***V***	**No. of *O* from 2004-2006**	***V***	**No. of *O* from 2006-2008**	***V***	**Total No. of *O***
All	75	**57**	48	**98** (+71.9%)	36	**141** (+43.9%)	34	**151** (+7.0%)	193
Detached	18	**70**	10	**123**	8	**159**	6	**180**	42
Semi	24	**61**	17	**97**	11	**142**	12	**139**	64
Terraced	28	**51**	21	**75**	15	**155**	16	**134**	80
Flat	5	**45**	0	**N/A**	2	**110**	0	**N/A**	5

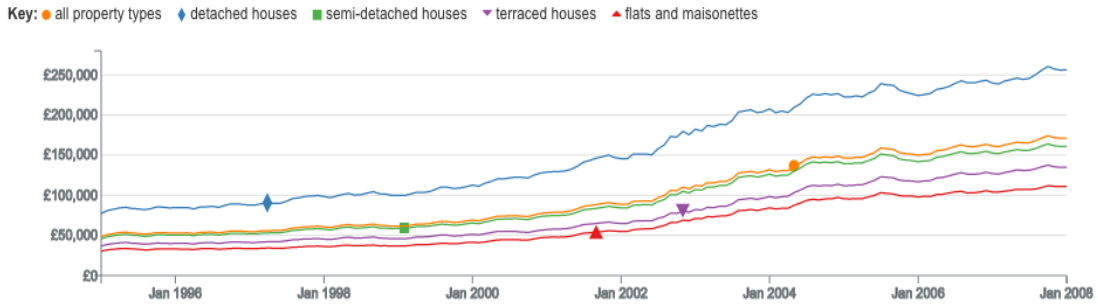

Figure 7. Average price: Wyre Forest from January 1995 to January 2008

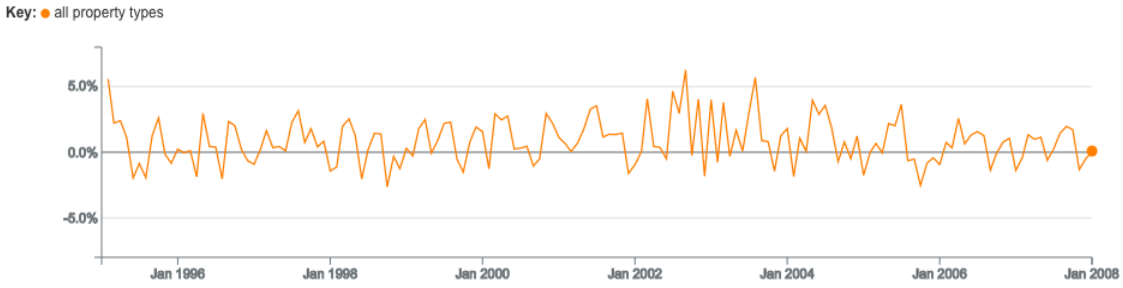

Figure 8. Percentage monthly change: Wyre Forest from January 1995 to January 2008

Key changes in values and purchases with time elapsed

In seeking to examine the effects of flood and flood defence impact on residential values, the researcher was limited to the possible amount of data, especially the flood protected houses (175 properties protected from a 100 year flood event), they could collect. Though the presented tables are not statistically significant, the key changes in values and purchases can still be analysed for exploratory purposes in relation to answering the studies central research question.

From pre-flood to post-flood phases, each data set experienced the highest average premium for all property types, all above 60 per cent. As described above, the property market in Wyre Forest saw the highest level of monthly change at the end of 2002, therefore the growth of the residential market and the defence instalment in 2002 could be explanations behind these large premiums.

In assessing pre-defence to post-defence phases, the stages with most significance to this study, results throughout each set of data collection are interesting. Houses protected by the defence were subject to the biggest premium of 10.7 per cent, whereas houses not protected experienced a large discount of 16.4 per cent. Houses in Severnside North (included in table 2) were protected by the flood event in 2004, but other properties were not; this may explain the discount in table 3 and the apparent decrease in premium for all property types in table 2 and 4. Furthermore, the decrease in number of purchases for table 2 may have occurred due to this, though houses protected by the defence saw a 61.5 per cent rise in purchases post-defence compared to the pre-defence phase.

FINDINGS

The findings from the data analysis and semi-structured interviews are presented by theme below.

Effects of flood defences on residential values

Interviewee 1 said the Bewdley flood defence implemented in 2006 has “widened the appeal and increased the marketability” of the protected properties, rather than significantly improving their values. On the other hand, interviewee 2 felt the defences had certainly improved the house values, but slowly, where over time the defences encouraged more affordable and accessible buildings and contents insurance for the protected houses. They went on to say that “confidence of the defences has helped boost values as the defences have now proved themselves”, where in addition to this,

interviewee 1 said the increase in media attention regarding the defence has helped increase awareness and interest in the houses protected by the defence.

The researcher also sought to determine the effects of flood defences on residential values via secondary quantitative research through the case study of Bewdley. Overall, pre-defence to post-defence instalment, the researcher found an average of 10.7 per cent premium for all property types situated in the protected area. Though this is relatively small compared to other phase to phase premiums within the protected houses, it was the highest premium from all three sets of data, where properties not protected by the defence saw a 16.4 per cent discount. This must be seen in the context of the flood event of 2007 and the property crash from 2007-2008.

This concurs with the limited existing literature in relation to flood defences and residential market values, only a small number of studies have been carried out exploring this issue. Studies and government publications have suggested flood defences help boost residential values, however, some findings show that defences aren't enough to significantly boost values. [24]

Effects of flooding and provision of flood defences on buildings and contents insurance

Both interviewee 1 and 2 feel the defence has increased the number of floodplain houses obtaining insurance in Bewdley, although interviewee 1 said the defence hasn't necessarily improved the obtainability of insurance, but has decreased the premiums for homeowners. Due to the decreased premiums post defence, interviewee 2 said "most properties which have never been able to get insurance due to flooding now have all obtained full building and contents insurance".

Various research studies have found evidence to suggest buildings and contents insurance is less accessible for high flood-risk properties, though other studies suggest other variables such as the type of insurer has more of an impact on premiums. [25] Interviewee 1 also supported this view, saying premiums "depend more on which insurance company homeowners approach", rather than the flood risk posed to the dwellings.

Effects over time of flood events and provision of defences on residential values

In terms of the effects over time of flood events on residential market values, interviewee 2 said initially after flood events in Bewdley, particularly the events in 1998 and 2000 (flood prior to defence implementation), there is a very little effect on values. They acknowledged that most homeowners during the 2000 floods retained possession of their assets due to the proposed flood defence instalment. This perhaps is the reason behind the fall in transactions post-flood phase (2001-2003) for properties in the protected area. Interviewee 1 also acknowledged this, where they even suggested the increase in media coverage post-flood "actually brings in more potential buyers occasionally, which obviously reflects higher transaction prices due to higher demand".

Figure 4 shows post-flood house values improving after flood events, likewise to interviewee 1's response. From the case study, the researcher also found similar results to the profile above where the largest premiums (all 60 per cent plus) pre-flood to post-flood were found for all houses situated in the floodplain.

CONCLUSIONS

How do flood defences affect the value of residential property?

Preliminary conclusions from the collected quantitative data would indicate that there is a positive effect on protected house prices pre-defence to post-defence, averaging a 10.7 per cent premium in

contrast to a 16.4 per cent discount for houses outside the protected zone. Though, the sample sizes are too small to give rigorous statistical conclusions and residential market growth rates could have more influence on premiums.
However, interviewee responses and existing literature all advocate that defences are not significant in relation to the increase in house prices, and that other benefits such as reduced premiums of buildings and contents insurance and the wider marketability of protected houses have more influence on the price and number of market transactions.

What are the effects over time of flood events and provision of defences on residential market prices?

In relation to the interviewee responses, the impact of flooding on Bewdley's house prices is not as significant as much of the speculation. Additionally, literature supplies a large variety of results, nevertheless it is a common trend for flooded houses to retain their values over time, where in some cases such as the case study the house prices exceed their pre-flooded values, though other aspects such as strong growth in the residential market could have more significance for this profile.
Regarding the case study of properties in Bewdley which flooded in Autumn 2000, as well as 2004 and 2007, there was no evidence of long-term impact on prices of houses in the floodplain, however, short-term analysis was not carried out by the researcher which could lead to alternative conclusions.
This dissertation aimed to answer the following central research question:

Can effective flood defences help maintain or boost UK residential property values in flood protected areas?

The research undertaken suggests that defences can slightly increase residential values, but not significantly. Although the house data samples are relatively small, the empirical results coincide with interviewee responses and logical and broad patterns linked to literature, by showing a larger premium in comparison to non-protected houses pre-defence to post-defence. Qualitative data suggests that the benefits of the defence in terms of greater marketability and availability of insurance are the major influencing factors in the observed increase in residential market values.

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ALVAR AALTO'S "EXPERIMENTAL PATIENT ROOM" AND THE PROBLEM OF ARCHITECTURAL RESEARCH

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INTRODUCTION

"During the past decades architecture has often been compared with science, and there have been efforts to make its methods more scientific, even efforts to make it a pure science."[1]
Despite this quote by the Finnish Architect Alvar Aalto being almost 80 years old, the "problem of architectural research" has not yet been fully resolved: What exactly constitutes substantial research in architecture and will an increasingly scientific approach really improve the quality of (public) space?
Alvar Aalto has been recently acknowledged as a forerunner for a research-driven approach to architecture, his 1930s icon, the tuberculosis sanatorium in Paimio, established as an example for the current field of evidence-based hospital design. Diana Anderson praises in this context Paimio's "comprehensive design strategies", where "the individual's privacy and comfort were of central importance", thus leading to the empowerment of the patient.[2]
And while the claim of a purely scientific design approach for Paimio is a myth, this paper will discuss Aalto's design strategies for the sanatorium, in particular the "experimental room", which – as Aalto claimed – played a central role to determine the layout of Paimio's 150 two-bed patient rooms.
The "experimental room" will serve as a lens to recognize the traps and possible shortfalls within the field of "evidence based design" as well as its potential for the qualitative improvement of the medical institution.
While medicine can rely on a defined research framework, -and although the term "evidence based design" may suggest otherwise- what exactly constitutes substantial research in architecture was and is not exactly clear.
This review on the relation between research and design underlines that, although especially in recent years there were important attempts to "demystify" the topic[3], architectural research still operates in a distinct grey-zone.

EVIDENCE-BASED DESIGN: EARLY EXAMPLES

Although evidence-based design[4], which has become particularly popular in healthcare to improve the well-being and recovery of patients, might seem a relatively new field of study, we can trace the approach to relate statistical data to the quality of (hospital) spaces back to the late 18th century.
After a devastating fire at the infamous "Hôtel-Dieu" in Paris, health commissioners of the Académie des Sciences produced a report which related the hospital's high mortality rates to overcrowding and the overall "insalubrious space".[5]
Although none of them were realized, in the following decade a number of plans came to be developed with the aim to answer the report's demands for a new, better ventilated and altogether more efficient type of hospital.

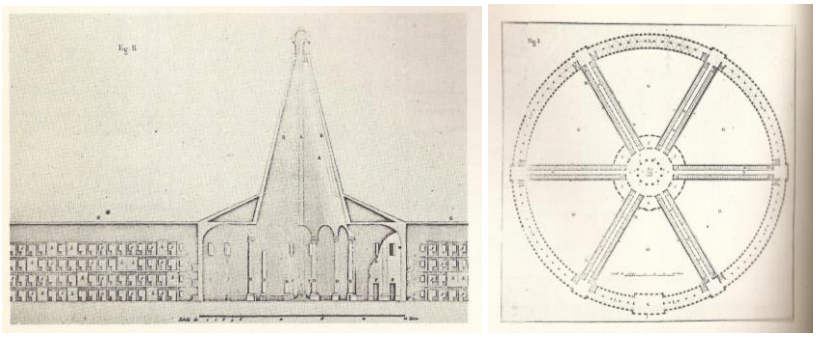

Fig 1. Dr. Antoine Petit, hospital at Belleville, 1774 plan and section with funnel-shaped tower acting as ventilator (six radii / wards: 2000 beds) (source: Mémoires de l'Académie des Sciences)

About 75 years later, we see a further ground-breaking step in the rationalization of hospital design. Florence Nightingale's first-hand experience of the sanitary conditions in military hospitals, especially during the Crimean War (1853-56), had made her a passionate advocate of a fundamental hospital reform for which she formulated an indisputable argument:

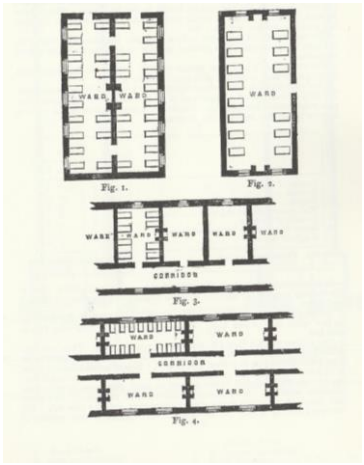

Fig 2. "Common errors in hospital ward construction" (Florence Nightingale, Notes on Hospitals, p. 103)

Nightingale's *Notes on Hospitals* (1859) demonstrates how empirical data and systematic spatial analysis informed her design proposals for the improvement of military and later general hospitals[6],
- culminating in the project for St. Thomas's in London, one of the most progressive / modern hospitals of its time.
Another 70 years later we witness the planning process of what Sigfried Giedion saw as "inseparably linked to the rise of contemporary architecture"[7] and Peter Blundell Jones called "the epitome of Modernist hospital design"[8]: Alvar Aalto's tuberculosis sanatorium in Paimio.
Within a state health programme that progressed spectacularly during the 1920s and 1930s, an extensive network of sanatoria for tuberculosis as well as mental health institutions was created for Finland.[9] Among them was Paimio, which came to be praised as the logical architectural outcome of the demands of medical sciences, as rational, functional for its purpose and based on international if not universal grounds. More recently Paimio has been even established as an example for the current field of evidence-based hospital design, given the "comprehensive design strategies", where the individual's privacy and comfort were of central importance". In "Humanizing the Hospital", Diana

Anderson even states that prior "to the development of evidence-based design, Aalto created a healing environment addressing each patient's psychological and social needs", thus leading to the empowerment of the patient.[10]
But which role did the scientific approach play for Aalto? And was Paimio's design approach indeed so fundamentally different compared to earlier sanatoria? And if so in which way may we benefit from it today?

THE AALTOS' UNIT FOR THE MINIMUM APARTMENT EXHIBITION (HELSINKI 1939)

Aalto's understanding of the relationship between research and design during his functionalist period sits within a more holistic understanding of the emergence of a new rational era, a new modern world, where "the individual exists in a porous relationship with his surroundings".[11] The changed society demanded a new architectural form and the new form would to a degree also constitute a mould for the modern society.
The Aaltos' unit for the Minimum Apartment Exhibition in 1930 in Helsinki illustrates their understanding of a "scientifically based housing research" which would then determine a standard for the "modern subject".[12]

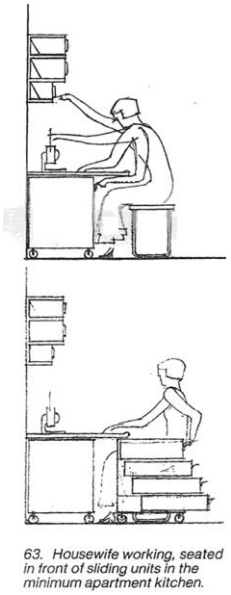

Fig 3. Aino Aalto's study of the body's movement, resulting in the famous kitchen diagram, was to determine the furniture layout of the apartment unit where "the body responded to the environment and vice versa". [13] (Image source: Pelkonen, Alvar Aalto, p.105)

The optimal environment for the scientific experimentation, which was needed to obtain what Aalto called the "flexible standard", was not the architectural office, however, but would prove to be Paimio sanatorium. From there the optimized objects, furniture or spatial compositions could travel and enter the realm of the commercial or the domestic space.

THE SANATORIUM: A CATALYST FOR SCIENTIFIC RESEARCH

During the industrialization tuberculosis had spread rapidly in wide parts of Europe. Especially large cities were affected due to the bad working and living conditions. The long-term treatment in a sanatorium was often believed to be the only hope against this deadly disease, because no pharmaceutical cure would be available against the bacterial infection until the 1950s. To find the best

way to treat TB, the sanatorium had been therefore traditionally a space for medical experimentation, where active research was confronted with established medical knowledge. Although, like many buildings required by the course of industrialisation, the sanatorium had been without precedent and thus without a typological model, the infectious nature of TB placed specific demands on the planning of the institution.
The internal organisation had to be based on the principles of hygiene and was strictly bound to medical and organisational necessities to avoid cross-infections between patients and staff. Cross ventilation, dust-free and well-lit spaces, as well as the provision of open-air rest facilities were furthermore general demands which had to be answered by the design.[14]

Fig 4. Geraniums in the double glazed windows and ceiling lamp for the dust-free environment (Paimio)

The institutional task was, however, more holistic: to provide an environment, which would activate the patients' overall health and thus their resistance against the disease. To foster for the physical as for the psychological wellbeing had thus been the sanatorium's raison d'étre. And this demand could then, as it does today, inspire different architectural responses.
Due to the inspiring brief, the remote location[15], and often generous funds, architects were faced with the rare opportunity not only to experiment with new materials and technologies[16] but also to develop and express their visions for a communal life.
Ten years after his experience with Paimio, Aalto reflected upon the conducted experimental research in the Technology Review (1940): Although architectural research could not, according to the architect, be compared to medical research, some of its methods could be used in order to render "dysfunctional" situations more visible:

> "Scientists very often use exaggerated forms in analyses in order to obtain clearer, more visible results – bacteria are stained, and so on. The same methods can be adopted in architecture, also. I have had personal experience with hospital buildings where I was able to discover that especial physical and psychological reactions by patients provided good pointers for ordinary housing…"[17]

Fig 5. Paimio patient wing

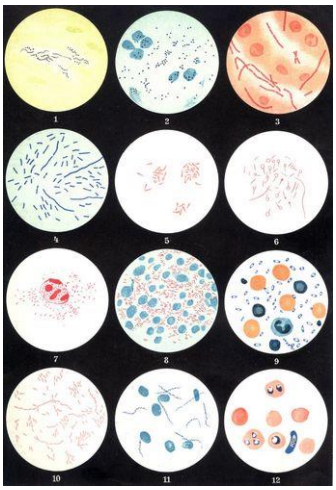

Fig 6. Bacteria: Nr.8 Tuberculosis (image source: Brockhaus, 1911)

The sanatorium was seen at the same time as the most suitable environment for research and object of research, since it holds the best suited "research subjects": the sensitive patients. The acquired knowledge could then be used for sanatoria but also for other building types, such as "ordinary housing".

The experimental room as a laboratory: results will be transferred to new contexts

It has been frequently stressed that Paimio was an opportunity for Aalto to become involved in material and structural research and innovation.[18]

Yet, what was truly innovative methodologically and justifies his model role for contemporary hospital planners is the use of an "experimental room" to determine the layout of Paimio's 150 two-bed patient rooms. This method where designers, patients and physicians would come together to test and evaluate different solutions deserves attention.

In "The Humanizing of Architecture" from 1940, Aalto refers explicitly to the Paimio experiments:

> "To examine how human beings react to forms and construction, it is useful to use for experimentation especially sensitive persons, such as patients in a sanatorium. Experiments of this kind were performed in connection with the Paimio Tuberculosis Sanatorium building in Finland (…) Study of the relation between the individual and his quarters involved the use of experimental rooms and covered the question of room form, colours, natural and artificial light, heating system, and so on. This first experiment dealt with a person in the weakest possible condition, a bed patient. One of the special results discovered was the necessity for changing the colours in the room. In many other ways, the experiment showed, the room must be different from the ordinary room. This difference can be explained thus: The ordinary room is a room for a vertical person: a patient's room is a room for a horizontal human being, and colours, lighting, heating, and so on must be designed with this in mind." [19]

In order to provide a calming, non-disruptive environment[20] for the "horizontal human being", Aalto further explained, that "the ceiling should be darker, with an especially selected colour suitable to be the only view of the reclining patient for weeks and weeks." [21]

Since the creation of peace was regarded as the pre-requisite for the healing success, Aalto further studied heating[22], lighting, ventilation, (famously) paid attention to the splashing noise of the wash

basins, and also tried to even out the internal acoustics through the installation of one "soft", sound-absorbing wall.
Unfortunately, the architect remained rather vague about the actual setup of the experiments. Although it is clear that physicians were also involved in the experiments conducted in order to determine the final layout of the patients' room it has not been recorded how many patients took part in the experiments ("sample size") and whether "real TB patients" were engaged.[23]

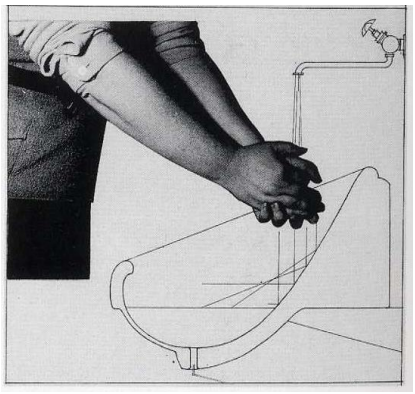

Fig 7. Paimio wash basin
(image source: Reed, Alvar Aalto, n.69)

Fig 8. Patients' room lamp

"To avoid noise [...] wash basins (each patient in the two patient rooms had his own) were especially designed so that the flow of water from the faucet hit the porcelain basin always at a very small angle and worked noiselessly."[24]
"The artificial light can not come from an ordinary ceiling fixture, but [to avoid glare] the principal centre of light should be beyond the angle of vision of the patient."[25]

"Turf wars": the experimental room and the cavetto

An indicator of how seriously Aalto integrated the medical expertise early on in his design and a testimony to the possibly not always smooth collaboration with the medical experts, is a detail, which has not been chosen to feature in any of the various early magazine publications: the transition between floor and window in the patient rooms.

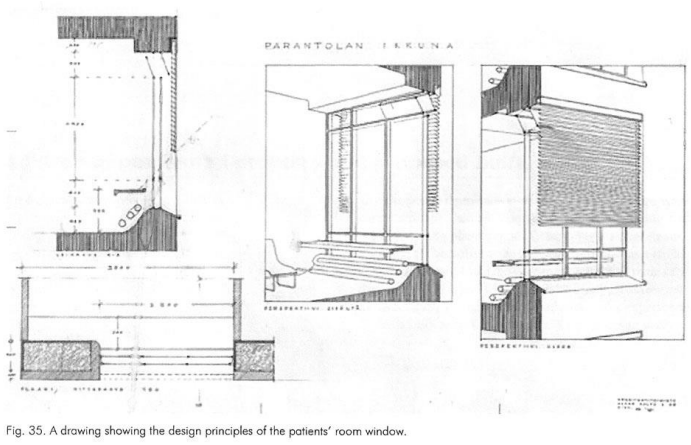

Fig. 35. A drawing showing the design principles of the patients' room window.

Fig 9. Paimio window sections and plan
(image source: Ehrström, Fig. 35, p.35)

Fig 10. Floor detail

Given the opposition of doctors involved in the implementation phase on the basis that the patient's feeling for security would be jeopardised with a full wall glazing, Aalto decided not to have the window meet the floor-level directly. Instead a convex curve is extending the floor upwards by about 30 cm to meet the window.[26]
Given that, as the occupier of the room (mainly lying in bed) one had to bend down to see this lower part of the room, how this minimal adjustment would provide for an increased feeling of safety for the patients remains questionable. Yet, this compromise seems to have satisfied the critical voices.[27]

THE COLLABORATION WITH THE MEDICAL PROFESSION. DIALOGUE; COMPROMISE OR COMPROMISING THE DESIGN?

Although the collaboration between doctors and architects had been traditionally embedded in the development of the sanatorium[28], Paimio is considered, still today, as exemplary in these regards.[29]
The discussed example of the outcome of the collaboration between doctors and the architect also allows for the question to be raised on how seriously Aalto took the results of the experiments and the medical expertise in case they did not meet his previous expectation and in case they threatened the formal appearance the architect had in mind.
Statements from medical experts had been considered by Aalto and his collaborators already during the competition stage for Paimio. During the implementation stage, however, the medical expertise would play an increasingly important role.
Altogether four specialists[30] were chosen by the Paimio Building Committee to evaluate the functionality of Aalto's competition entry and subsequently to accompany the implementation stage: The physicians did not only suggest changes for psychological reasons (predictions about patient behaviour) or logistical reasons (based on their detailed knowledge of the daily patient routine), but also for economic reasons.

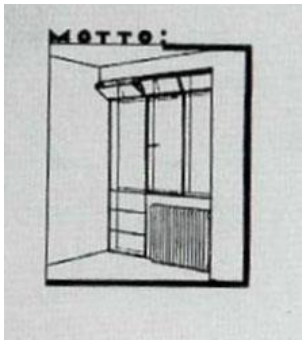

Fig 11. The Paimio competition stage motto, the L-shaped window (image source: Reed, Alvar Aalto, n.56, amended by author)

Both, Aalto's competition motto, the L-shaped patient room windows as well as the original patient bed decks for the fresh air therapy were considered too expensive by the experts and therefore fell victim to the "medical expertise".[31]

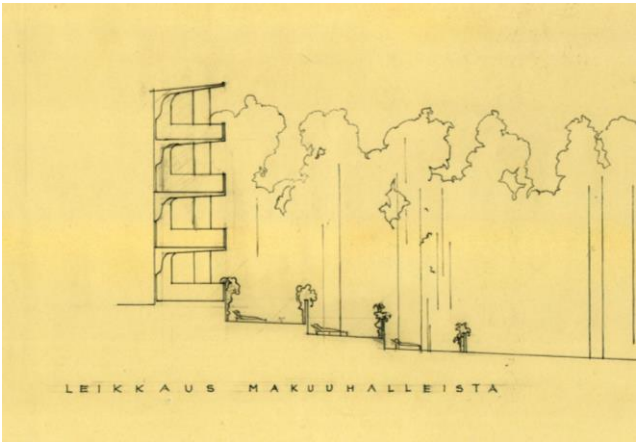

Fig 12. Paimio Sanatorium competition stage section detail 1929: outdoor pavilions / terraces flanking the south side of the patient wing (Makuuhalleista = outdoor halls / pavilions for the daybed cure / helio therapy) Courtesy of Alvar Aalto Museum, Drawing Collection

Given that the experts "interfered significantly (…) and many of the proposed alterations were realized despite leading to major changes in the design",[32] I doubt that Aalto was particularly keen on the (forced) collaboration with medical experts on the project.

SCIENTIFIC JUSTIFICATION: FROM PROTOTYPE TO SERIAL PRODUCTION

The possibly confrontational dialogue with the medical profession, however, had clear advantages for the later recognition of Paimio and its design objects. Given the design's foundation on medical expertise it was not only possible to create an indisputable argument for the Paimio project (prototype for the medical institution) but also to create a strong argument for the serial production of Paimio furniture.

The Paimio chair

Many of the furniture and standard parts which were developed specifically for the sanatorium became quickly commercially produced.[33] The 1931 "Paimio Chair", still produced by Artek today is, however, the most famous example.

Fig 13. Paimio chair

Although steel-tube furniture was part of "cutting edge" furniture design in the 1930s, it felt, according to Aalto, too cold and hard. Instead the plywood furniture which was at the same time "warmer" than steel and yet as easy to clean was more pleasant in "the long and painful sanatorium life."[34]

It was the user's comfort and hygiene which was said to have dominated the design, with the particular angle "in the backrest to aid the patient's respiration"[35], and thus serving as an example for the successful collaboration between architecture, knowledge of the body and medicine. The first standardised wood furniture was thus developed with the declared goal, not only to produce light, flexible and easy to clean chairs, but to use material best suited for the requirements of the human body.[36]

What came to be known as the "Paimio chair" was first exhibited at the Nordic Building Fair in Helsinki in summer 1932, even before the sanatorium itself had been inaugurated. In the following year also other pieces of Paimio furniture were internationally presented and finally mass-produced.[37] These pieces of furniture, specifically developed for the wellbeing of the human body would now be available also outside the realm of the medical environment and for the end-user at home.

CONCLUSION

Given the Paimio design process: Should we not value Alvar Aalto more as forerunner for evidence-based design?

Although Aalto's consideration for the patient as the center of his design has been relentlessly repeated and one could also get the impression, that he invented the collaboration with the medical profession, this was actually not the case. Physicians had been traditionally the driving force of the sanatorium project or at least been involved in the planning. And also the psychological wellbeing of the patient has been the central concern of sanatorium design from the very time of its emergence in the 1860s.

A truly interesting contribution to innovative hospital design, however, is Aalto's methodological approach of using an "experimental room" where patients, doctors and architects would have the opportunity to develop design solutions together.

Instead of spending more and more time on the evaluation of user questionnaires, which often seem to state what we as architects (should) already know, instead of selling the idea of "patient empowerment" to clients on the basis that they were previously questioned about their preferred surface material, the "experimental room" seems to be a setting which would involve the user and medical expertise in the design process while at the same time taking advantage of architectural core competences instead of negating them.

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[1] Alvar Aalto, "The humanizing of Architecture," *The Technology Review* 11 (1940).

[2] Diana Anderson, "Humanizing the hospital: Design lessons from a Finnish sanatorium," CMAJ 182 (11) (2010): 535. Anderson explains further that "the details incorporated into the building design by Aalto illustrate many of the evidence-based design strategies published in recent years". (Ibid. 536)

[3] Compare for example: *Architectural Research Methods* (Linda Groat, and David Wang, 2013), *Design Research in Architecture* (Murray Fraser, ed., 2013), *Demystifying Architectural Research: Adding value to your practice* (Anne Dye, and Flora Samuels, eds., 2015) and *Research Methods for Architecture* (Ray Lucas, 2016).

[4] Evidence based-design can be loosely defined as „the process of basing decisions about the built environment on credible research to achieve the best possible outcomes." (Anderson, Humanizing the hospital, 535.)

[5] After comparing, for example, the amount of air that was available to each patient with the mortality rates the commissioners demanded a reform of the hospital plan: the single patient should be granted more space while

the overall space should be used more efficiently. The commission pleaded for an overall improved ventilation of the wards and also made concrete design suggestions, demanding “no more than 36 beds in a ward, all single beds, iron bedsteads and iron window frames.” (Nikolaus Pevsner, *A History of Building Types* (New York: Princeton University Press, 1970) 151-152.)

[6] Although the germ theory of disease had not been fully accepted then, Nightingale’s deductions from her spatial analysis and the comparison of the statistical data deriving from a variety of hospital wards drew her into the right direction and would lead to significant improvements in sanitation. Although the first plan for a hospital with detached pavilions had been used at Stonehouse Naval Hospital in 1764, Nightingale strongly argued for and thus further cemented the success of the pavilion type hospital in the 1860s and was famously involved in the realization of St. Thomas’s hospital in London.

[7] Sigfried Giedion, *Space, Time, Architecture* (Basel: Birkhäuser, 2000), 629.

[8] Peter Blundell Jones, “The hospital as building type,” *The Architectural Review* 1261 (2002): 42.

[9] The Finnish State founded a tuberculosis commission in 1922 and organised the health work dividing up the countryside in TB welfare districts and creating TB welfare offices in the cities. Compare Margaretha Ehrström, Sirkkaliisa Jetsonen, and Tommi Lindh, *Nomination of Paimio Hospital for Inclusion in the World Heritage List* (Helsinki: National Board of Antiquities, 2005).

[10] Anderson, Humanizing the hospital, 536. Anderson explains further that “the details incorporated into the building design by Aalto illustrate many of the evidence-based design strategies published in recent years”. (Ibid. 536)

[11] Eeva-Liisa Pelkonen, *Alvar Aalto Architecture, Modernity and Geopolitics* (New Haven and London: Yale University Press, 2009), 58.

[12] In a Domus article from 1930 Alvar Aalto explains the intentions behind the unit’s development. Compare: Göran Schildt, *Alvar Aalto in his own words* (Helsinki: Otava Publishing Company, 1997), 77 – 78.

[13] Pelkonen, Alvar Aalto, 104.

[14] The patients’ exposure to sun and fresh air was originally anchored in the natural therapy. Physicians, such as Robert Koch, postulated the aim to “live in well-aired and well-lit rooms, so that the germs, taken up in air, can be rapidly carried away by the flow of air or killed by light.” (Robert Koch, “The current state of the struggle against tuberculosis,” in *Nobel Lectures, Physiology or Medicine 1901-1921* (Amsterdam: Elsevier Publishing Company, 1967 (1905).

[15] In Arkkitehti 6/1933 Aalto describes the architectural freedom he was given through the Paimio site, which „is about 3 kms from the station and fairly isolated. Consequently, there were few constraints on the design of the entire building complex...”. (Nina Heikkonen, ed., *Paimio Sanatorium Conservation Management Plan* (Helsinki: Alvar Aalto Foundation, 2016), 44.)

[16] Strict medical demands posed on the hygienic environment for the lung patient had been, since the emergence of the sanatorium in the 1860s, a driver for technical and infrastructural innovation (from air-filters to elevators and efficient heating systems), but also for architectural experimentation. To avoid coal fumes for the patients, the cogeneration of heat and power was for example first explored on a large scale for the Beelitz Heilstätten, an important sanatorium complex close to Berlin, founded in 1898.

[17] Aalto, The Humanizing of Architecture, 102. To stay with Aalto’s metaphor we could see the sanatorium here as the environment for the “stained bacterium”, a well-tempered Petri dish – a space which is particularly well suited to make things visible and obvious and thus allow the architect to develop generalizable deductions.

[18] The concrete skeleton which was described as “an enormous wonder of engineering and workmen’s skills” (Turunmaa 17.6.1933, in *Paimio Sanatorium Conservation Management Plan*, edited by Nina Heikkonen, 61.) certainly pushed structural boundaries and the fruitful collaboration with the engineer Hartela resulted in Paimio’s daring construction and - despite its size – the slender and elegant appearance.

[19] Aalto, The Humanizing of Architecture, 102 – 107.

[20] The task of the sanatorium was, according to Aalto’s understanding, to provide a peaceful environment, appropriate for cure. “The main purpose of the building is to function as a medical instrument […] One of the basic prerequisites for healing is to provide complete peace.” (Alvar Aalto in *Alvar Aalto, Between Humanism and Materialism*, ed. Peter Reed (New York: The Museum of Modern Art, 1998), 29.
Accordingly in Paimio not only spaces with similar requirements with regards to views or light were placed together but furthermore distributed according to a logic of noise.

[21] Aalto, The Humanizing of Architecture, 103. The ceiling was accordingly painted in dark and calm colours (grey-green), not to exert the eyes, while the walls were kept in lighter shades possibly to give a more generous perception of the room.

[22] "For the heating system in the experimental room, ceiling radiators were used but in a way which threw the heat mainly at the foot of the bed so that the head of the patient was outside the direct heat rays." (Ibid.103)
[23] It is not unlikely that Aalto himself contributed most of the information regarding the preferences of the "horizontal patient". The architect had been allegedly ill and bedridden just before entering the Paimio competition and the experience of this time probably imprinted on the patient room design. Unfortunately I did not find specific records of the experiments. We therefore lack information about who exactly and how many people were involved (sample size and if for example actual TB patients), and how exactly they were conducted. My deductions are based on Aalto's texts and the information provided by Hilla Pandy, an official guide of Paimio hospital in 2009, as well as by information given by Professor Kari Liippo.
[24] Ibid. 103
[25] Ibid. 103
[26] The curb vanished when radiators were placed under the windows during the 1970s renovation process. It can today still be seen in Paimio's museum room.
[27] Given that, as the occupier of the room (mainly lying in bed) one had to bend down to see this lower part of the room, how this minimal adjustment would provide for an increased feeling of safety for the patients remains questionable.
[28] In sanatorium construction medical expertise had always played a central role. If the "places of healing" were not commissioned by physicians and thus designed according to their wishes in the first place. Examples are: Dr. Brehmer's sanatorium in Görbersdorf, Dr. Dettweiler's sanatorium Falkenstein or Dr. Turban's sanatorium in Davos.
[29] "Today it is becoming common for architects to hold focus groups or employ registered health professionals to obtain feedback on the design of health care buildings, but in the 1930s, this was not the case. Aalto was ahead of his time in consulting with physicians as he planned the sanatorium." (Anderson, Humanizing the hospital, 537)
[30] The four physicians were Markus Sukkinen (an original member of the building committee) as well as Severi Savonen, Niilo Mäkinen and Dr. Vöinö Horelli.
[31] Most prominently, Aalto's competition motto, the L-shaped patient room windows fell victim to the "medical expertise" and was exchanged for (more conventional) square shaped ones. (Compare: Heikkonen, Paimio Sanatorium Conservation Management Plan, 58)
Considered too expensive by the experts were furthermore the original patient bed decks for the fresh air therapy on the south side of the patient wing. What was ultimately retained from the competition stage was only the outline, which was translated into a cross-country ski-track like walkway zigzagging through the grounds. This compromise between designers and physicians resulted in a solution which may have still fitted the overall graphical design, but which has certainly weakened the original spatial composition.
[32] Ibid. 60. "Luckily not all the alterations were accepted; for example, the cantilevered balcony wing without supporting pillars was considered expensive, but Aalto and Hartela succeeded in implementing the elegant design." (Ibid. 60)
[33] Many of the lamps and light fixtures were developed specifically for Paimio, since the demand for a cleanable surface which would not gather dust was not easily met with existing lamp types. Paavo Tynell and his company Taito Oy were the partners here.
[34] Aalto explains the design process: "The flexible wooden furniture are a result of experiments also made at the Paimio Sanatorium. At the time of those experiments the first tubular and chromium surfaces are good solutions technically, but psycho-physically these materials are not good for the human being. The sanatorium needed furniture which should be light, flexible, easy to clean, and so on. After extensive experimentation in wood, the flexible system was discovered and a method and material combined to produce furniture which was better for the human touch and more suitable as the general material for the long and painful life in a sanatorium." (Aalto, The Humanizing of Architecture, 104.)
[35] Cuito, Aurora (ed.): *Alvar Aalto*, teNeues Publishing Group, Kempen, Germany, 2002, p.8
[36] Eeva-Lisa Pelkonen, however, challenges the material narrative and doubts purely sensory reasons for choosing wood. According to Pelkonen "the impetus for using wood [...] originated from the protectionist policies introduced in Finland [...] during [the] economic recession. [...] At that time, the Finnish government began taking a more active role in the co-ordination of trade agreements, including assigning special quotas for both exports and imports. [...] Bent-wood as a material had in this context the virtue of being both economical and thoroughly Finnish – it was made in its entirety of Finnish birch, not least because the importation of steel [...] became restricted." (Pelkonen, Alvar Aalto, 113.) Thus the material choice had the advantage to be appealing to the Finnish public and the government, ultimately Aalto's employer in the case of Paimio.

[37] Together with the "Paimio Chair" also other pieces of Paimio furniture were presented in 1933 at the "Finnish Laminated Furniture" exhibition in London, which due to their serial production, could be "marketed under the slogans of value for money and comfort." (Ehrström, Nomination of Paimio Hospital for Inclusion in the World Heritage List, 19.)

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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A RESOLUTION TO CHANGE: DEMOCRATIC PROCESSES INFLUENCING PUBLIC CONTROL OVER ENVIRONMENTS

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INTRODUCTION

Our environments are shaped by our elected representatives, among other actors. Citizens make judgements about what elected representatives can do to make a positive impact on urban and rural environments. These judgements shape demands. Elected representatives, in turn, make judgements about what they can do, and want to do, to affect change. This impacts on interactions with the electorate. These points apply across a range of countries.

This paper considers links between public health, elected representatives — primarily councillors — and the built environment. It focuses on councillors and canvassers gathering information about local environments from dialogue with constituents and from 'walkabouts' (transect walks) in local communities, as a stage in improving how and where we live. The walking routes considered range from observational walks and tours of an area through to election-canvassing routes. The experiences of councillors and canvassers, while some steps removed from architects and planners' practice, are a valid source of contextual information. The example of England is used but with reference, in the literature review section, to public health tools employed globally.

Firstly, the background literature is set out. It covers some of public health's core concepts (the determinants of health, inequalities in health, needs assessment, community mapping and community development) and how they link to councillors and their role. Following a description of the methods used, primary data gathered from interviews is employed to illustrate the complexities of relations between environments and elected members. The findings are then discussed with regard to what they reveal about key questions of public influence over environments, mediated by public health and elected representatives. In concluding, recommendations for further action are provided.

PUBLIC HEALTH, COUNCILLORS AND THE BUILT ENVIRONMENT

There are various definitions of public health.[1] In one report, the World Health Organization (WHO)[2] has said it is "the art of applying science in the context of politics so as to reduce inequalities in health while ensuring the best health for the greatest number". A key concept for the discipline is that of the wider determinants of health.[3] Here, not only do genetic and lifestyle factors, alongside health services, influence health, but also broader issues such as housing are considered. In addition, the WHO and national governments have focused on the gap in health between different groups, or health inequalities,[4] and sustainable development goals target wider health determinants.[5] 'Social and community networks' and effective political institutions are determinants of health.

Although public health can be seen as 'everybody's business', a key area of employment in the discipline involves data collection and interpretation.[6] In England, epidemiological, demographic and

environmental data are provided by a government agency, Public Health England. And locally, needs assessments are one of a range of tools used to describe, triangulate data, benchmark and put forward recommendations on health issues. Public health staff have also employed community mapping, walkability assessments[7] and transect walks. The first involves stakeholders recording local problems, as well as assets, such as green spaces. The transect walk is a technique derived from surveys of flora and fauna, such as butterfly populations, whereby a set route is walked on a regular basis, with a focus on observation. Further relevant concepts include 'community development' and 'participatory design'.[8] The tools are used in developing countries and have been described by the World Bank.[9] The references provided here give an indication of their use in Africa and Asia.[10] [11] [12] Transect walks have also been used pedagogically, for example, they have been used by Dr Salim Vohra for undergraduate teaching on health determinants. Given this article's concerns with relations between councillors and public health, the parallels between a transect walk and a canvassing route, walked prior to elections, is striking. Councillors' and other canvassers' opinions on observing environments during walking routes are discussed in the findings section.

Local authorities in England cover a wide range of planning and public health functions. They are controlled by councils of elected representatives who are normally from one of the three main political parties. There is a sizeable literature on councillors' modus operandi. Given public health's focus on health inequalities, it is notable that areas with poorer health, and lower incomes, tend to be represented by Labour Party elected members, and better-off areas are more likely to be represented by Conservative Party members.[13] The context to councillors taking on the role includes the level of allowances. In London reimbursement is £11,045, rising to £85,162 for a mayor.[14] The average wage in London and the South East of England is approximately £24,000 and around £20,000 in less well-off regions.[15] The pool of potential candidates is restricted, not only by the rate of allowances, but also by the workload involved. The role and remuneration favours retired people or those with 'independent means', such as second-home landlords. The role is recognised as stressful and dealing with social media is considered, to a certain extent, to have added to this problem.[16]

Election turnout data is easily available, and gives some indication of citizen engagement, but it is typically not sourced in public health reports. The Local Government Association (LGA) commissions polling on the public's understanding and views on councils. For example, pollsters Ipsos MORI have in the past found that the public were almost equally interested in international issues as local issues.[17] Polls have tended to show that a high percentage of the public want more of a say in how services are run, but they are also not knowledgeable about where the responsibility for services lies.

Polling has been concerned to find out how local authority services' and councils' reputations can be improved. However, polling has been less likely to ask what the public know about councillors' political profiles, council meetings and other political vehicles, including petitions. The role of councillors, as a group, in affecting change is rarely promoted. Thus, for instance, while council newsletters have been recommended as an effective communication tool, and polling suggests people often don't know who their councillor is, the newsletters tend not to provide information about the councillors. The activities of council meetings are also not referred to. For example, resolutions have been advertised randomly on different websites.

PUBLIC HEALTH DATASETS AND METHODOLOGY

The primary data used in this paper is drawn from two sources. Firstly, the relationship between councillors and public health was discussed in face-to-face interviews conducted on a one-to-one basis, and in pairs, with all elected representatives in one borough, in August and September 2009. Interviews were recorded, transcribed and analysed by theme. Twenty-six councillors were interviewed, along with

one MP and one MEP. Two MEPs and one councillor did not respond to the request to be interviewed. The summary topics discussed were: public health data available for councillors to use; issues raised by, and problems experienced by, residents; politically controversial issues, such as income inequalities; and party-political activity. For the purposes of this article, the data extracted pertain to issues raised by residents about their locality and local environment, and the elected representatives' consequent actions. The councillors' political affiliations were mixed, consisting of Labour, Conservative and Liberal Democrat.

Secondly, interviews were conducted with people who had been canvassers in the 2017 general election. The councillor interviews had frequently mentioned issues about canvassing as a means of uncovering public views and issues. The canvasser interviewees, as we will see, referred to councillors' canvassing. In total, 21 face-to-face interviews, covering 19 constituency areas, were conducted. These interviews were with Labour canvassers, but, unlike the councillor interviews, they did not generate any party-political issues, rather, they solely related to discussing street-environments and processes for forwarding problems raised by the electorate.

PUBLIC INFLUENCE AND CONTROL OVER THE WIDER DETERMINANTS OF HEALTH

Attention in this article is focused on complexity in the way information about problems, to do with how and where residents live, is brought to politicians. Their actions to address issues at other stages in the 'policy process' is not the focus here. But an assumption is that an increase in 'issueness', or issues being raised and discussed, will influence politicians' actions.[18] Councillors hear about issues covering housing, planning, roads and transport, crime, health services, schools, immigration and more. While the topics raised are manifold, they are still filtered by residents. Thus, no councillor in our sample said that any residents had raised workplace issues with them. Yet, from a public health perspective, the workplace is an important setting that can provide health benefits and create health problems. Likewise, issues such as income inequality, privatization and corporate taxation are in danger of falling through a 'democratic representation net' unless councillors work hard to seek out public opinion on these issues. In addition, councillors may be grappling with issues where their powers are restricted, or where there is a balance to be made between employment, environments and health, such as with alcohol licensing. Other public health issues are very different for different groups, such as non-car drivers. Thus, "the richest 10 per cent of the population effectively receive four times as much public spending on transport as the poorest 10 per cent" and "one in five men and one in three women do not drive".[19] Nevertheless, councillors in the sample reported that complaints from car drivers about potholes were ubiquitous.

Polling of residents has found that "those [council services] which affect the visual appearance and atmosphere of an area" tend to have the greatest impact "on overall views of a council". But of greater impact, the same survey found, was levels of deprivation and ethnic diversity. Issues around planning and local development also had an important bearing on satisfaction levels.[20] The public health-related information acquired by councillors is therefore broader in character than that dealt with by public health departments.

The councillors' perspective blends information from direct observation of streets and neighbourhoods, residents' understandings and experiences of them, and councillors' powers to change these environments. The councillors interviewed gave examples of housing issues they witnessed and the public raised with them. These included: problems with rats; difficulties in phoning landlords and housing associations (due to them 'not caring' and residents' not having the finance to make phone calls); lack of housing; empty properties; houses in multiple occupation (entering some of these properties felt dangerous); over-concentrated social housing and not enough people with money;

conversely – not enough social housing; high turn-over of residents; and, loneliness in single occupancy households.

Thus, one said: "There is a high turnover of residents in poor quality housing…If rent is paid by benefits they'd rather be in the centre…near pubs." One councillor added: "That area is crisscrossed with paths and rights of way [shortcuts], it would be good to have a map of them all…Car ownership is low and people walk."

In another area of the town, a councillor said neighbourhood complaints related to noise: "Everyone here is on top of each other. One dysfunctional family moves in and walls in the flats are so thin, they drive their neighbours up the wall."

However, the housing issues merge with other socio-economic issues, such as, on the positive side, creating beautiful parks and schools within walking distance from homes, through to substance misuse, traffic, swimming pool closure, single parenting and poverty.

The councillors also listed their achievements, including, for example, controlling empty and derelict properties, challenging a bus company to maintain existing routes, reducing street drinking in a neighbourhood, supporting neighbourhood children's activities, organizing public meetings on issues like climate change, supporting school committees, local groups and clubs, developing employment opportunities and overseeing development of land for housing. One said: "The councillors worked on getting restoration of the park. It's [now] enjoyed by everyone."

Added to this, councillors are often party-politically engaged. Thus, certain councillors in our borough had strong views on national policies to deal with unemployment, health service administration and the national minimum wage. Most felt that income inequalities were too high and did not think bankers' earnings should be so high.

The complexity of a councillor's role in relation to receiving and dealing with issues includes questions such as:

- Is the issue anything the councillor can address, or is it casework relating to topics outside their remit?
- Is the councillor part of the leading council group, or more isolated?

Routes to contacting councillors are vital and need to be regularly reviewed and widely advertised, if the councillors' role in relation to environmental and health improvement is to flourish. Information on MPs, their role and relations between MPs and councillors could also be promoted. One communication channel is face-to-face contact by councillors or their party supporters. However, in relation to communication methods, on the one hand, polling data on residents' views of council communications does not tend to discuss direct contact, they instead emphasize the benefits of council websites and newsletters.[21] On the other hand, 'boots on the ground' are considered to be influential in winning elections.[22] This is a view certainly shared by the councillors interviewed here. A number said they had knocked on every door in their ward and felt this was the reason they were elected.

At the 2017 general election, hundreds of canvassers supported door knocking and leaflet drops in some constituencies. The canvassers that were interviewed had different perceptions of 'street issues', depending on their personal perspectives and what they had been told to do by their election organiser. One said that he was a very unobservant person and would not notice anything unless it was pointed out. Another, for example, said she took copious notes of problems she saw and residents' views on issues, such as, street lighting and drainage, and she fed them back to the candidate. She said, for instance, that: "The doorbells in the flats are an issue. In the lets [rented flats] they don't work and in some blocks the entry system is so loud it disturbs those flats near it." Another said, "We saw a derelict house. But we were with a councillor and they said they would deal with it."

Steps and stairs were an issue, for instance: "The stairs in one block were shocking. They were see-though. [Which is] not good for people with a fear of heights. The lift wasn't working." And another said "Some blocks had steps down to them and then up again. It was on a hillside, there were steps everywhere." Another general complaint was street labelling, one simply said "it's rubbish."
Generally, the issues councillors and non-councillor canvassers came up with were similar, with some canvassers reporting detailed observations. Thus, canvassing was a rich source of additional information about how where people live can be improved. However, at the same time, in stark contrast to walking round neighbourhoods and talking to people, further uses of information and communications technology (ICT) in supporting democracy and improving the built environment may yet emerge.

RECOMMENDATIONS AND CONCLUSION

Recognising the value of communications between the public and politicians about built environments, and changes to strengthen dialogue, can support improvements in how and where we live. The role of the councillor as a source of, and conduit for, qualitative information to improve environments has been highlighted here. LGA data indicates that the public regard their street environment as important and councillors have a role in acting as eyes and ears that can deal with issues; discussing and responding to residents' concerns. Canvassers support this process by relaying information to current and prospective politicians.
But there is a wider problem with the visibility of the councillors' political role. The councillors' role, from a public health perspective, should not just be to promote flu jabs, for instance.[23] A search for more opportunities for local authorities to highlight the councillor's political role and educate the public about it, is needed. For example, council resolutions affecting environments are difficult to locate on websites and, more broadly, education in motion-writing as part of the debate process has been neglected, outside of the trade union movement.[24] In addition, further scrutiny of the role of ICT in supporting democracy is necessary if important opportunities to develop public control are to be taken.[25] This might address, for instance, communications between councillors and the public on decision-making and council budgets.[26]
Councillors can act to improve public health in ways that council staff are not in a position to do. In local authorities, only elected members can go beyond service delivery issues to highlight the more political upstream determinants of health. Only they can move the focus of debate from health inequalities to income inequalities, and other contentious political issues that influence population health. If poverty and inequality are among the key drivers of dissatisfaction with local areas, then it is remarkable that councillors' influence over income inequalities is not highlighted. Thus, a checklist mapping 'the politics of how and where we live' is recommended. Councils' consideration of the political role of elected representatives in improving environments could include the following type of audit:

- How are the public encouraged to raise issues with elected representatives, such as councillors?
- What issues are they encouraged to raise?
- Are important issues falling through a 'representative net', i.e. not being covered by MPs or councillors?
- What relevant issues have been debated at council and assembly level?
- Should the role and remit of elected representatives be altered, for instance, in the light of globalization and climate change?[27]

Further debate is needed on developing democratic processes that lead to sustained environmental improvement, improvements in health and wellbeing and the narrowing of social and environmental

inequalities. This paper has highlighted the complex nature of data collection at the local level and the opportunities to take steps to acquire different perspectives. Less visible issues, such as inequalities, may be brought to the fore and politicised and this can impact, as well, on living and working environments.

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TOWARDS A MORE ACTIVE CITY: A MULTIDISCIPLINARY APPROACH

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1. INTRODUCTION

Rapid urbanization trends have influenced population-wide health conditions by affecting physical activity levels. The current prevalent sedentary lifestyle is identified as one of the causes of non-communicable diseases such as diabetes, cardiovascular diseases, and cancer.

The association between the built environment and activity has been addressed within multiple fields of research. Urban designers, transportation planners, and public health researchers now advocate for a more active lifestyle among urban residents. However, each of the three disciplines adopts a different focus and different approaches, leading to a multiplicity of varied results, lacking a common consensus on the most effective approach to address the association between the built environment and human activity.

The aim of this paper is to provide a multidisciplinary conceptual framework which integrates the diverse approaches of the three disciplines. This is achieved by conducting a literature review covering the current divergence and convergence in the conceptual and methodological approaches they adopted to promote active behavior. Opportunities for integration of knowledge between the three disciplines are discussed and presented in the form of a conceptual framework, which would serve as a basis for future research targeting the built environment and physical activity.

2. URBAN DESIGN FOR FOSTERING HUMAN ACTIVITY

Urban designers have primarily adopted the “Normative Theory”, which highlights the interaction between the behavior of individuals and their environment[1], providing principles for the design of public spaces that foster human activity. This helps urban designers achieve their goal: creating more livable environments.[2] [3]

Theories Adopted by Urban Designers

Post World War II, increased automobile dependency caused rapid urban sprawl, resulting in increased traffic congestion and sedentary lifestyles. Urban spaces no longer encouraged residents to engage in activities. Subsequently, influential urban critics such as Jane Jacobs and Kevin Lynch advocated for a focus on the influence of the built environment on human behavior and quality of life.[4]

Work by Jacobs presented the notion of a “healthy” city. However, this approach focused on enhancing the general health of communities rather than the physical health of residents. Lynch also argued that conventional planning only targets physical characteristics of the environment, neglecting activity support, resulting in urban spaces which frustrate people's aspirations[5].

Later work by Jan Gehl classified activities performed within public spaces into two categories: necessary and optional[6]. Gehl advocated for designing public spaces that accommodate both of them[7]. His work focused on three types of activities: walking, standing and sitting, disregarding other forms of activity.

Subsequent urban planning movements including The New Urbanism (1980s) have also advocated for promoting activity within urban spaces in order to increase quality of life[8]. They highlighted the importance of prioritizing pedestrian activity and discouraging automobile dependency[9].

Despite their aim to investigate the influence of the built environment on activity, it could be argued that urban designers have not addressed physical activity behavior per se, as they have disregarded other forms of physical activity (e.g. bicycling, jogging, structured sports). However, the concepts and theories they used may provide the basis upon which the relationship between the built environment and physical activity could be explored.

Methods Used by Urban Designers

Urban designers argued that measurable -or objective- built environment variables (e.g. sidewalk width, building heights) interact to generate more subjective urban design qualities (e.g. vitality, human scale, imageability)[10]. They suggested that these variables and qualities elicit certain human reactions when they reach specific "thresholds"[11]. It is these reactions in turn which influence behavior and activity (figure 1).

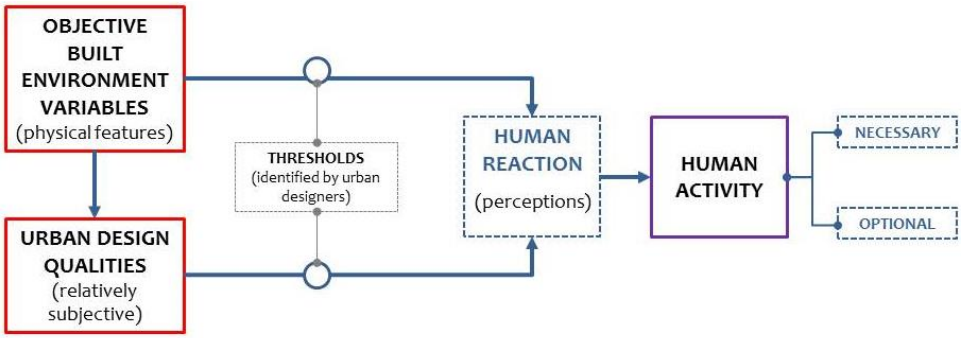

Figure 1 The conceptual approach adopted by urban designers.

Urban designers were concerned with identifying valid thresholds or standards. They also relied on behavior observation methods in order to assess objective built environment variables and urban design qualities[12], evaluating them against identified thresholds and associating them with observed behavior. Examples of these methods include conducting "Test Walks" and "Tracking".
Urban designers examined the built environment without evaluating human reactions. Therefore, it could be argued that behavior observation methods fail to account for the influence of human perceptions on behavior[13] [14].

Scale Studied by Urban Designers

Urban designers typically studied micro-scale built environment variables[15] (e.g. landscape elements, street furniture). They argued that the slow movement of pedestrians increases their awareness of the built environment, compared to automobile drivers or passengers[16]. At this speed, micro-scale variables and qualities are more likely to influence behavior.
These variables are easily assessed at a limited geographical area[17]. Urban designers usually conduct assessments within a specific area (e.g. a public open space) or route (e.g. along a street). However, despite the influence of micro-scale variables on walking, it is arguable that they are insufficient to comprehensively address the association between the built environment and physical activity, as other macro-scale variables are also influential[18].

3. TRANSPORTATION PLANNING FOR PROMOTING ACTIVE TRAVEL

Transportation planners have been fundamentally concerned with the management of vehicular traffic through monitoring travel behavior[19]. However, during the 1970s, their focus has slightly shifted towards facilitating public transit use and active travel in order to combat traffic congestion and urban sprawl.

Theories Adopted by Transportation Planners

Transportation planners rely on the "Microeconomic Demand Theory", which assumes that travel behavior results from the demand to reach a specific destination in order to fulfill a specific purpose.

Therefore, they omitted recreational activity. They identified travel behavior in the form of "trips", and studied trip characteristics, especially travel mode choice. Transportation planners developed models to monitor travel behavior. These models assumed that the frequency of trips is determined by a number of variables, including the built environment, and the price of travel in terms of cost and time.

By acknowledging the influence of the built environment on travel behavior, the concept of "Walkability"[20] has emerged. To date, a multitude of built environment variables has been associated with walkability. A study by Frank and Pivo (1994)[21] proposed "The Walkability Index", as a proxy measure for walkability, expressed as a function of three built environment variables: land use mix, residential density, and street connectivity[22] [23]. Other researchers have argued that although these variables provide an account of walkability, they are not sufficient to comprehensively capture the walkability potential of an area.

The approach adopted by transportation planners (figure 2) fails to address recreational activity, as well as activities that are inadequate to identify in the form of "trips" (e.g. structured sports). Therefore, it could be argued that their approach neglects the relationship between built environment variables and wider physical activity behavior.

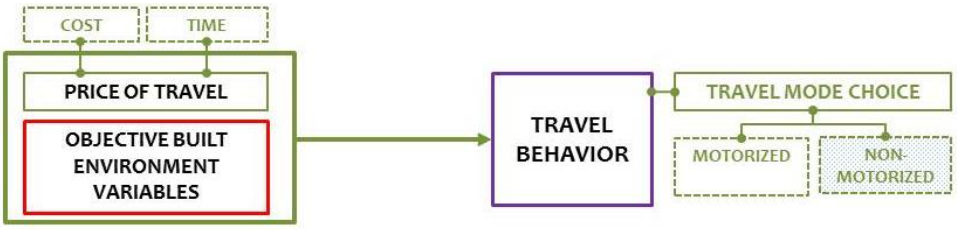

Figure 2 The conceptual approach adopted transportation planners.

Methods Used by Transportation Planners

Transportation planners used travel diary surveys to monitor travel behavior. Reporting travel behavior performed by respondents, they only accounted for utilitarian trips. Therefore, a few recent studies have developed activity diaries, which report recreational trips as well. However, the data collected on walking behavior was still found to be less complete than the data on automobile travel[24].

Transportation planners typically used these surveys to assess one or two days of travel or activity, which does not give an account of the total level of habitual activity performed[25]. These surveys rely on respondents' recall capabilities, and they are rarely tested for their validity and reliability[26].The disaggregate data collected is then aggregated to represent the average travel behavior or activity patterns of residents within an area.

Transportation planners relied on readily available built environment georeferenced data sets -usually available in the form of GIS databases- in order to spatially match the aggregated travel data with built environment variables[27]. It has been argued that this method fails to account for people's perceptions of their environment, as it only incorporates objective built environment variables.

Scale Studied by Transportation Planners

Transportation planners fundamentally evaluated macro-scale built environment variables (e.g. residential density, land use mix, street connectivity). This is due to their primary interest in travel mode choice rather than the experience of walking, and due to the fast speed of motorized travel which only allows for a limited awareness of the built environment.

Due to larger distances covered by automobiles as compared to walking, it is suggested that travel behavior is influenced by the built environment at larger geographical extents. Therefore, transportation planners assessed macro-scale variables within an area of predefined administrative boundaries (e.g. census tracts, traffic analysis zones). These variables demonstrated an association with an increase in public transit use [28] and walking[29]. However, it has been argued that they do not sufficiently capture the fine-grained characteristics of the built environment experienced by pedestrians, which are detrimental to walking[30] . Therefore, evaluating macro-scale variables only

does not comprehensively provide an account of the built environment variables that influence physical activity.

4. PUBLIC HEALTH APPROACHES FOR ENCOURAGING PHYSICAL ACTIVITY

Public health researchers typically implemented personal interventions to promote active behavior. Recently developed socio-ecological models of health emphasize the need to investigate the influence of the built environment on physical activity[31]. This field involves identifying and measuring associated built environment variables[32 33].

Sedentary lifestyles are now prevalent, as motorized transit displaces transportation physical activity, while sedentary recreation replaces recreational physical activity. Contemporary public health research focuses on promoting "Active Living", aiming to incorporate physical activity behavior into daily routines, with a target of accumulating a total of 150 minutes of activity per week[34].

Theories Adopted by Public Health Researchers

The concept of "Affordance" is central to socio-ecological models of health. It suggests that the individual is a perceiver of affordances -or visual cues- within the environment[35]. Researchers suggested that the environment may comprise affordances that either attract or deter a specific behavior. The concept of "Behavior Setting" also suggests that people's behavior is influenced by the physical and social context within the environment[36 37]. Physical activity is setting-specific[38], as certain settings elicit certain types of physical activity.

Physical activity is also behavior-specific, as the influence exerted by the built environment varies according to the type of behavior taking place[39 40]. Public health researchers advocated for developing models for specific behaviors[41]. For example, it was suggested that walking for transportation is highly influenced by the presence of various destinations, while walking for recreation is influenced by environmental aesthetics.

The "Personal Construct Theory" suggests that physical activity is also construct-specific. It advocates for investigating personal characteristics -or constructs- of respondents[42]. These constructs alter an individual's perception of their environment; therefore confounding the relationship between the built environment and behavior.

Methods Used by Public Health Researchers

Public health researchers acknowledged the influence of objective built environment variables on physical activity behavior. However, they hypothesized that this influence is mediated by the perceived -or subjective- built environment (figure 3).

Measuring objective built environment variables represented a new area of research for physical activity researchers[43], as they initially evaluated perceived variables. However, the current evidence base for associations between subjective and objective variables and physical activity are equally strong[44]. It is unclear whether the objective or perceived built environment variables are more predictive of physical activity. Researchers constantly advocate for simultaneously investigating both types of variables[45 46]. To date, only a few studies have done so[47].

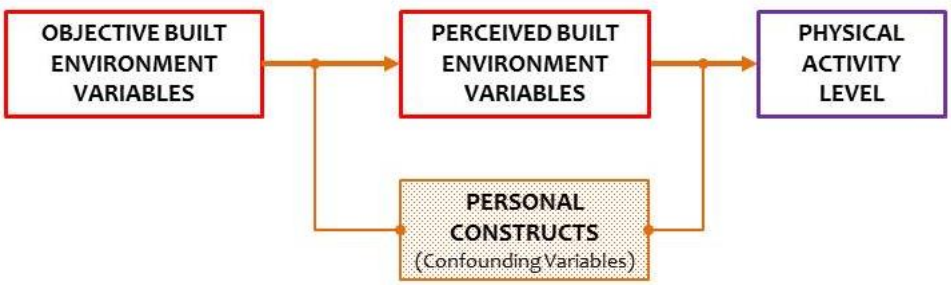

Figure 3 The conceptual approach adopted public health researchers.

For investigating the perceived built environment, public health researchers relied on self-report media (e.g. questionnaires, interviews). Meanwhile, studies evaluating objective built environment variables relied on conducting environmental audits[48], which enabled the observation and evaluation of a set of built environment variables, usually according to a preset scoring system. Like transportation planners, public health researchers sometimes obtained built environment data from existing georeferenced data sets[49] [50].

Self-reported methods allow the investigation of subjective variables that environmental audits might fail to investigate. They are also less costly to conduct. However, the declining response rate due to long questionnaires[51] is a great challenge. In comparison, audits enable the assessment of micro-scale variables that georeferenced datasets might not accurately provide. However, the process of conducting an audit is time consuming and labor intensive. Obtaining data from georeferenced datasets may be less labor intensive and time consuming if the data is already available, accurate, and complete. However, these datasets are less likely to contain data on micro-scale variables; therefore they are more convenient for obtaining data on macro-scale variables as compared to audits.

Public health researchers relied on physical activity sensors (e.g. pedometers, accelerometers) to record levels of activity performed[52]. However, these are limited in ability to measure a variety of activities. Therefore, researchers more commonly use self-report methods, in which participants provide an account of the frequency and duration of physical activity performed throughout the typical day over a period of time[53].

Scale Studied by Public Health Researchers

Public health researchers suggest that both micro and macro-scale built environment variables influence physical activity. Micro-scale variables directly influence physical activity, while macro-scale variables indirectly do so by altering the characteristics of the area in which the activity is performed[54] . Studies suggest incorporating both macro-scale and micro-scale variables for a more comprehensive evaluation of the influence of the built environment on physical activity[55].

The majority of physical activity performed was found to occur within a walkable distance from a participant's home [56]. Physical activity researchers focus on measuring built environment variables at a walkable geographical extent around a respondent's home -typically identified as a buffer of 400 meters radius[57].

5. A MULTIDISCIPLINARY APPROACH

The accumulation of research in three distinct disciplines emphasizes the impact of the built environment on one form of activity or another. However, in order for research to develop, researchers from the three disciplines must collaborate and synthesize their findings to create integrated methodological approaches that serve their purposes[58] [59]. Table 1 outlines the discussed divergence in conceptual and methodological approaches by researchers within each of the three disciplines.

Table 1. Different approaches across the three disciplines

	Aim	Theories Adopted	Methods Used		Scale Studied		Outcome Studied
			Built Environment	Activity	Level	Extent	
Urban Design	Increasing livability	The Normative Theory	Behavior Observation		Micro-scale	Urban Space	Built Environment Quality
Transportation Planning	Reducing traffic congestion	The Micro-economic Demand Theory	Georeferenced datasets	Travel + Activity diaries	Macro-scale	Community	Public Travel Mode Choice

Public Health	Achieving health benefits	The Socio-Ecological Model	Environmental audits Georeferenced datasets Self-reports of perception	Physical activity sensors Self-reports of physical activity	Micro-scale	Walkable Distance	Physical Activity

It is notable that this divergence is due to the different aims of researchers of the three disciplines. Thereby, the prpopsed multi-disciplinary approach suggests that a unified focus on "Physical Activity Promotion" will support the achievement of the aims of the three disciplines. This will enable a more comprehensive assessment of the built environment variables associated with human activity. It suggests that there are four categories of variables that should be considered:

1. Built Environment Variables
2. Price of Travel
3. Personal Constructs
4. (Physical) Activity Level

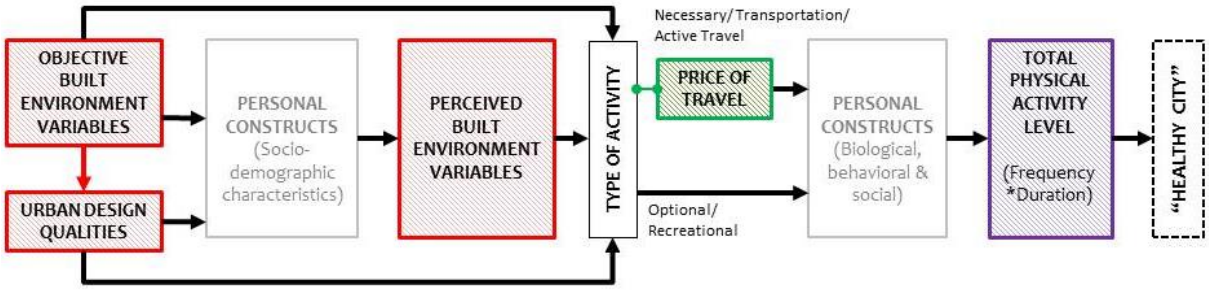

Figure 4 The proposed multidisciplinary conceptual approach.

1- Built Environment Variables

The influence of objective and perceived built environment variables and urban design qualities should be collectively addressed, while incorporating both macro-scale and micro-scale characteristics of the built environment. They should also be assessed at large geographic extents which represent the built environment at a specific area, and at walkable geographic extents, which will more directly influence physical activity.

Data on macro-scale objective variables should be obtained from available georeferenced data sets. Therefore, transportation planners can contribute methods of administration and indices to provide measures of macro-scale variables. Micro-scale variables are more comprehensively assessed using built environment audits. Public health researchers can provide audits which have been tested for their reliability and validity, and which have a preset scoring system. Identifying valid thresholds for variables measured by audits is a critical requirement. Therefore, urban designers can incorporate identified thresholds into these audits. They should also provide a definitive set of operationalized urban design qualities associated with physical activity behavior.

It is suggested to assess perceived built environment variables using reliable and valid self-report surveys, which are prominent within the public health field. They could be adopted by urban designers and transportation planners in order to account for the influence of an individual's perception on their activity.

2- Price of Travel*

Price of travel in terms of travel cost and time should be accounted for in case of evaluating utilitarian activity. These variables have only been addressed by transportation planners. However, they could be

influential in determining whether individuals walk, cycle, or choose motorized transit. Data on these variables could be obtained from archival data sources.

3- Personal Constructs

Personal constructs confound the relationship between the built environment and physical activity performed. They should be investigated as some of them may alter an individual's perception of the environment (e.g. age, gender, educational attainment), while others may inform an individual's decision to perform activity (e.g. biological, behavioral and social variables). They could be incorporated into self-report methods that assess an individual's perception of the built environment.

4- (Physical) Activity Level

Providing a total measure of physical activity levels is crucial. The reliance on behavior observation – occurring at one point at a time-, does not provide an account of the total physical activity levels performed by participants. Therefore, relying on self-reports of physical activity behavior will yield more reliable results, enabling the identification of statistically significant associations between assessed built environment variables and total activity levels.

6. CONCLUSION

The proposed multidisciplinary framework facilitates the symbiotic exchange of methodological approaches among the three disciplines. This is likely to increase the validity and reliability of research within each field. The unified methods of assessment will also provide comparable and generalizable results. By adopting a focus on promoting physical activity through providing built environments that support various forms of physical activity, active travel will prevail over motorized transport, urban spaces will become more livable, and population-wide health conditions would be enhanced. This approach will more comprehensively reflect the optimum built environment conditions of a "healthy city".

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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ESTABLISHING THE CONNECTION BETWEEN ARCHITECTURAL DESIGN OF HOMES AND INHABITANTS' PSYCHOLOGICAL WELL-BEING

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INTRODUCTION:

This paper explores the relationship between two distinct fields; architecture and psychology. Architecture can have an impact on people's behaviour and health.[1] Homes are our primary experience of architecture and are culturally highly important.[2] Expressions like 'home is where the heart is', and 'an English man's home is his castle' imply its importance.[3] Despite the existence of strong link between architecture and well-being,[4] there is a little evidence to link the aspects of architectural design to levels of wellbeing in home design. This study is one of the first to demonstrate that the design of our homes – in particular – users' satisfaction, has a direct impact on their overall psychological well-being.

The make-up of home:

Saunders and Williams argue that the concept of home consists of three main aspects; social (the household), psychological (meaning and identity), and physical (the structure itself). It is commonly argued in the literature that a home is not just a house; it is not just a physical structure. It is a socio-spatial concept; a spatial unit in which the household interact and reproduce.[5] However, although it is the social and personal aspects that give a house a sense of home, it is the physical structure that facilitates and frames these aspects.[6] We argue that more attention should be given to the architectural design of a home for two important reasons; first: the physical house is the place within which the social and personal activities occur, creating the right space for these activities might have an effect on the way and the success with which these social activities happen. Second: the physical house is the only aspect that architects and contractors have control over in the home system; the physical house in which the social and psychological aspects take place. While we cannot have any influence on social and personal aspects, we can aim to create a physical structure that may promote inhabitants' quality of life.

The architectural design of the built environment can impact –enable or constrain- certain human behaviour and activities.[7] A home bears much more meaning than simply being a shelter. Taking 78.7 years as average life expectancy, people spend almost 50 years in residential buildings or near them, making homes number one in terms of occupancy duration.[8] However the term 'Home' is very broad, and holds a wide variation of meanings,[9] the current research focuses mainly on the impact of the physical aspect of the home system on the other two aspects; social and psychological. Therefore, we refer to home as the *residence*, the physical place that people live in.

This research investigates the relationship between home and SWB through exploring psychological needs satisfaction.

Well-being and needs satisfaction:

Well-being is a broad concept that embodies several components. Health and Well-being UK define WB as the balance point between five main aspects; physical, social, economic, environmental and psychological.[10] Each and every one of these aspects affects, and is affected by, the others, therefore it is possible that by promoting psychological WB we can promote overall quality of life.

Psychological WB is generally about living well, it is "a combination of feeling good and functioning effectively''.[11]
Human psychological needs can be seen as the key nutrients for psychological well-being.[12] Satisfaction of the psychological needs is the fundamental way of prompting psychological well-being. Satisfaction with living accommodation is considered to be one of the main factors affecting psychological well-being.[13] Therefore, satisfying human needs through architectural design might be one route to promote levels of well-being.

Psychological needs:

Human needs have been addressed through different theories in the last century; one of the most widely published theories of needs in psychology is Maslow's hierarchy of needs, which categorizes psychological needs into 5 hierarchal levels, starting with the very primary needs at the bottom of the pyramid and rises up to the growth at the top.[14] Maslow's hierarchy of needs consists of 5 consecutive levels of needs: physiological needs, safety, belonging, self-esteem and self-actualization. These needs can be categorised into 2 groups; physical needs (physiological needs and safety), and psychological needs (belonging, self-esteem & self-actualisation). However, the idea that these needs are hierarchichal has since been critiqued by psychology scholars. More recent theories addressed mainly psychological needs; for example, Deci and Ryan's Self-Determination Theory (SDT).[15]
SDT identifies three main psychological needs; the need for relatedness, competence and autonomy. Deci and Ryan refer to these needs as the key nutrients for promoting psychological WB.
For the purpose of this study, we identified architectural aspects that could help to fulfil the psychological needs of inhabitants', and consequently, promote their well-being.

Model of Architectural Needs:

Drawing from the psychological literature it is possible to translate human needs into architectural features; Model of Architectural Needs.
The Model of Architectural Needs suggests five aspects of architectural design that aid psychological needs satisfaction and should then promote levels of WB; *physical structure, security, social environment, privacy and personalisation.* The combined levels of all five architectural aspects represent the subjective perception of home, (the red and green dotted lines in figure 1).

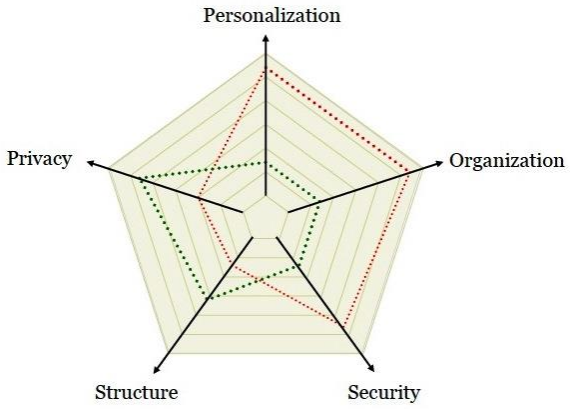

Figure 1: Model of Architectural Needs

Considering the importance of the way in which people feel about their homes in relation to their well-being levels, we argue that: firstly, the architectural design of a residence might be related to inhabitants' psychological WB, secondly: it might be possible to promote people's psychological WB by defining architectural elements that support human psychological needs.

Hypotheses:

- Hypothesis H1: satisfaction with living accommodation affects, and is related to overall satisfaction with life.

- Hypothesis H2: satisfaction with the physical structure of the home affects satisfaction with other elements of home design; security, organization, privacy and personalization.
- Hypothesis H3: satisfaction with the physical structure is related to overall satisfaction with living accommodation and with subjective well-being.
- Hypothesis H4 predicted that levels of personalization have an impact on overall satisfaction with living accommodation.

METHODOLOGY:

Research Design:

This research consisted of three main parts; measuring subjective WB, measuring home WB and exploring aspects of home design in relation to the both subjective WB and home WB.

Procedure and sample:

The findings reported in this paper originate from a survey conducted to evaluate participants' subjective well-being and their overall satisfaction with their living accommodation as well as individual aspects of this accommodation. The eligibility criteria required the participants to be adults living in any type of housing, and to be English speaking (in order to understand and answer the questions properly). A convenience sample of 101 participants took part in the study, this sample size was chosen for small to medium effect size study. The survey was distributed both electronically and in paper copy. The electronic format, with 61 respondents, was designed using Qualtrics software and was distributed on social media; mainly through Facebook, while paper copies, with 40 respondents, were handed out to participants in four areas in Bristol; Broadmead, the Harbourside, Baldwin Street and on the University of the West of England campus. The questionnaire was structured in three main parts; a general and established measure of subjective well-being,[16] a measurement of the respondents' satisfaction with their living accommodation (this measurement was developed by the research team following the subjective well-being measurement) and respondents' evaluation of specified aspects of the accommodations (the physical structure, security, organization, privacy and personalization) which were selected based on the 'Model of Architectural Needs' being developed by the researchers. For this study, we were interested in the existence of a relationship between satisfaction with these aspects and overall satisfaction with living accommodation, and general satisfaction with life.

Participants

The table below illustrates the study sample and demographic information.

Table 1. Sample spit

	N	Percentage spit		Min	Max	M	Std.
Age	92			20	59	31.4	9.1
			Male	20	42	29.8	5.6
			Female	21	59	32.5	10.7
Gender		35.6	Male				
		55.5	Female				
		8.9	Unspecified				
Country	59	58.4	UK				
	11	10.9	Jordan				
	8	7.9	Other				
	23	22.8	Did not say				
House type		45.5	House				
		45.5	Flat				
		1.00	Student accommodation				
		8.00	Other				

Household	43.6	Family
	20.8	Partner
	16.8	Friends
	8.9	Sharers
	12.9	Alone
House ownership	57.4	Owned
	41.6	Rented

Descriptive statistics of key variables:

In order to examine the survey data, we calculated the mean of subjective well-being, home well-being, satisfaction with physical structure, level of security, belonging, privacy and personalisation.

Table 2. Mean and standard deviation of key variables

	Subjective well-being	Home well-being	Physical structure	Security	Belonging	Privacy	Personalisation mean
Mean	4.70	4.42	3.19	3.50	3.06	3.27	2.87
Std. Deviation	1.31	1.49	0.72	0.67	0.81	0.75	0.94

We then ran three sets of correlation tests; first, between SWB and home WB, then a cross correlation of SWB and satisfaction levels mean of the five aspects of home, and finally, a cross correlation of home WB and satisfaction levels mean of the five aspects of home.

Table 3. Correlations

	Subjective well-being mean	Home well-being mean	Physical structure mean	Security mean	Belonging mean	Privacy mean	Personalization mean
Subjective well-being mean	1	0.55 0.00	0.31 0.00	0.16 0.13	0.15 0.13	0.07 0.49	0.04 0.72
Home well-being mean	0.55 0.00	1	0.46 0.00	0.21 0.04	0.24 0.02	0.10 0.36	0.32 0.00

We also tested personalization as a possible indicator of satisfaction with life. We run a correlation test (N = 91) between the ability to modify the space (in this case the home) and levels of satisfaction with home (home WB).

RESULTS AND FINDINGS:

The survey identifies three key findings that support the proposed hypotheses.

Satisfaction with residence and levels of well-being

In order to examine the first hypothesis; whether there was a relationship between levels of satisfaction with one's residence and their well-being, a correlation between the home satisfaction mean and subjective well-being mean was conducted. The results showed that there is a strong correlation between the two means. ($r = .55$, $p = \leq .01$), supporting the hypothesis.

Satisfaction with physical structure and overall satisfaction with residence

To examine the second and third hypotheses; the relationship between satisfaction with physical structure and the overall satisfaction with living accommodation (H1), as well as with subjective well-being (H2), A correlation analysis was run between physical structure mean and both subjective well-being mean and home well-being mean. Results confirmed the prediction to be the case. Correlation between satisfaction with physical structure and subjective well-being (N = 98) was found to be significant with ($r = .31$, $p =\leq .01$) and correlation with home WB was also found to be significant with ($r = .5$, $p =\leq .01$).

Personalisation and overall satisfaction with life and residence

The forth hypothesis suggested that there is a strong relationship between the importance of personalisation and satisfaction with both residence and life. The results confirmed both relationships. ($r = 03$, $p = \leq .01$).

On further investigation, we analyzed the previous correlation of personalization and home WB in relation to satisfaction with physical structure. We found that personalization has more significant importance when there is less satisfaction with physical structure. We categorized personalization results into three groups; restricted ability to modify, moderate ability to modify and high ability to modify (within the legal and physical regulations). The same strategy was undertaken to categorize satisfaction with physical structure into three groups as well; from not satisfied at all – very satisfied. Then, we performed a graph analysis of the relationship between home well-being and satisfaction with physical structure in relation to personalization. Results showed that personalization levels were highest when satisfaction with physical structure was at lowest level. On contrary, personalization was of less importance for sample with highest satisfaction with the physical structure.

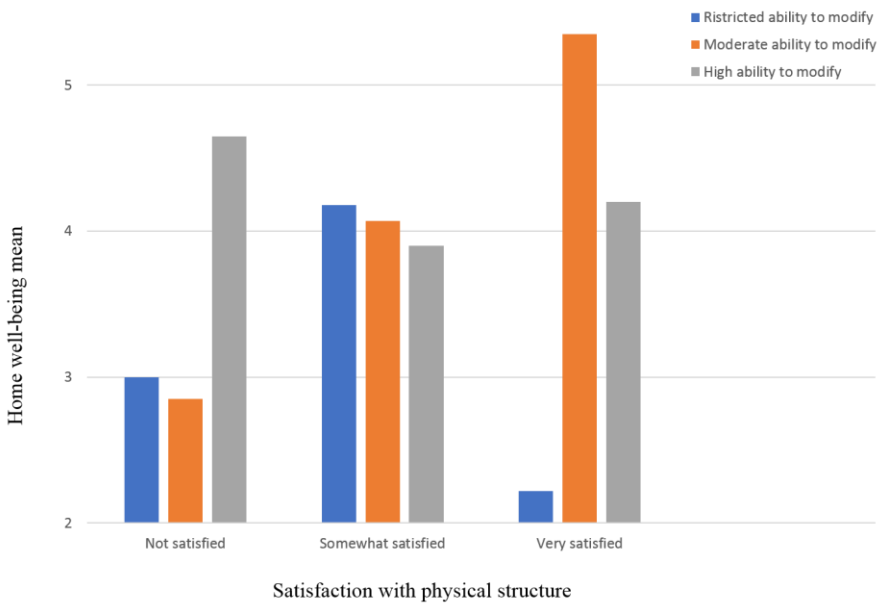

Figure 2: Relationship between Home well-being and satisfaction with physical structure in relation to personalisation

DISCUSSION

The current study aims to contribute to the existing literature regarding the psychological impact of the built environment on users, with a special focus on homes. We investigated the relationship between perceived housing quality and inhabitants' psychological well-being, from the perspective of 101 participants. Consequently, the key findings of the survey are:

- There is a direct relationship between levels of satisfaction with the residence and levels of inhabitants' WB.
- Satisfaction with the physical aspects of the residence is strongly related with inhabitants' overall satisfaction with their residence.
- Levels of personalization have a strong impact on both subjective well-being and inhabitants' satisfaction with their residence. This may be the way people use to compensate for their dissatisfaction with their accommodation; people with higher levels of satisfaction with tend to describe their accommodation as home, regardless their ability to personalize or modify, while people with lower levels of satisfaction with try to redecorate and personalize more to transform their residence into a home.Additionally, we found that the physical structure does affect inhabitants' overall satisfaction with their living accommodation and their satisfaction with life in general. Furthermore, satisfaction with the physical structure of a home is linked to a more positive perception of other elements of the home, such as perceptions of privacy and personalization.

Relationship between subjective well-being and home well-being

The results of our study show a positive correlation between satisfaction with living accommodation and overall satisfaction with life. The concept of home has been discussed widely in different fields; literature, sociology, geography, psychology, economy, architecture, etc. and each field looks at home from a different point of view. In psychology, as well as in other fields, home is considered to be an emotional and social concept. In architecture, it is the structure and the design of the house that affords most of the attention. These different points of view do not necessarily lead to conflicted meanings for home. In fact, some research combines both definitions into one comprehensive definition; the physical unit within which social and psychological behavior of the household occur.[17] Despite the existing literature on the relationship between home and well-being in a wide variety of contexts (such as homelessness, elderly housing, dementia housing, etc.) there are almost no existing studies on the direct relationship between house satisfaction for general population and their psychological well-being.

The power of physical structure

We hypothesized that satisfaction with the physical structure of the home has a positive influence on overall satisfaction with the house itself as well as overall satisfaction with life. The importance of the physical structure of the home is often neglected in housing literature, which mainly focuses on the psychological and social aspects. This can refer to the depth of meanings the term home holds; a home "The home has seen us at our worst, and still shelters and protects us".[18] However, researchers argue that built environment can enable or constrain certain human behavior and activities.[19] The results of this paper confirm the second hypothesis and show that satisfaction with the physical aspect can indicate higher levels of overall satisfaction with living accommodation, and subsequently, higher levels of psychological well-being.

Physical structure satisfaction and perception of other home aspects

Since the built environment can affect human behavior and activities, we hypothesized that satisfaction with physical structure of home indicates greater perception of satisfaction with other elements of home, this could be related to the need for autonomy.[20] Personalization was found to be more important when people are less satisfied with physical aspect of the home. This might be the way they try to compensate for their dissatisfaction; by personalization the house can be psychologically transformed into a home.[21] Personalization was also found to be of less importance when the house was owned by the resident, this might also be due a sense of satisfaction where there is no need for further intervention to make it feel like home.

Limitations

There are some limitations in this study that should be taken into consideration. First, the sample size is small (N = 101) for small-medium or small effect. Secondly, due to availability of the sample, participants were mainly from the UK and Jordan with a minority from other countries all

over the world. A more representative sample would give more confidence in the replicability of the findings.

Conclusion

The results of the current study add to the vast literature consolidating the argument that built environment factors, such as satisfaction with living accommodation, interact closely with psychological variables such as satisfaction with life.[22] These variables will in turn potentiate the generation and maintenance of psychological outcomes, such as higher levels of well-being. The finding that satisfaction with living accommodation affects overall satisfaction with life, and that better satisfaction with one's home leads to higher levels of psychological well-being, strengthens the evidence that home design plays an important role in residents' health and well-being. This is the most significant contribution of this study to the literature on housing health and well-being literature. The finding that the physical structure has a direct impact on the overall satisfaction with a home is another significant finding of this study. This adds to existing literature on the meaning of home with an emphasis on the importance of the physical aspect of the house and its link to the psychological aspects. This suggests that we should use the physical elements of home design to empower and support the non-physical elements. The last significant finding of the study is that personalization is at its highest importance when satisfaction with physical structure drops to lower levels. This might indicate that people try to compensate for dissatisfaction with their residence by personalizing and modifying the space into their own home. The findings of this study can be of a significant importance not only for architects, but to contractors, policy makers as well as having a positive impact on the cost of mental health services.

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HEALTHY URBAN ENVIRONMENTS ON SOCIAL HOUSING IN LEON, MEXICO.

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INTRODUCTION

Mexican cities have been expanding uncontrollably in the last few decades. One of the main factors has been the accelerated construction of social housing developments on the peripheries of the cities. Urban sprawl has been one of the causes of abandonment of houses, violence, insecurity, inadequate infrastructure in Mexican cities. This constant extension of the cities in Mexico and poor maintenance of infrastructure are accompanied by inefficient public transport and other lack of services such as hospitals and schools. These problems can cause a dependency on car and access to basic public services becomes more difficult for those living on the peripheries. [1]

In the case of Mexico, social housing is one of the biggest proportions in the housing stock. The impact of social housing in Mexican cities is significant because a critical number of these developments are built on the peripheries, far from the central areas and disconnected from services.[2] This paper explores the consequences and characteristics that impede the development of healthy urban environments in social housing in Mexico, specifically in the city of Leon.

Firstly, it is important to describe what is social housing in Mexico and its current provision in the country. Social housing in Mexico is affordable housing which might be obtained by employees working in the formal sector and earning a certain amount of money. The mortgage can be obtained based on the earnings of the employee and the Mexican minimum wage. These houses are acquired with a loan granted by the government through different federal agencies.[3] However, one of the leading problems with the current provision of these mortgages is the impossibility to obtain it for those who work in the informal sector. Hence, only two-thirds of the households have access to the housing–finance institutions.[4] These discrepancies specially in the housing sector for low income population can affect their health.

> The importance of housing for health and the increasing lack of affordable decent housing puts housing firmly back on the public health. [5]

Living in inadequate housing can have repercussions on the health of those living there and in the society.[6] Promoting and enabling healthy urban environments is crucial to have successful social housing developments as well as having an efficient, unbiased housing finance system and providing quality housing is vital to achieving a more equitable housing system.[7]

Healthy urban Environments

It is fundamental to identify which characteristics are part of a healthy urban environment and how to address the social causes of ill-health because environmental health has a significant effect on the population.[8] Creating urban spaces on a human scale with enough green areas and all the required services such as hospitals, schools and retail areas are part of a healthy environment. These characteristics and spaces have a positive impact on the health of the population. Currently, in Mexican urban areas the lack of

education, employment, poor infrastructure and unsafe neighbourhoods might be affecting the health of their inhabitants. Having these problems contributes to a stressful urban environment. For example, the lack of comfort and stress for long periods of time can have a significant toll on the health of a person.[9]

> According to the Zagreb declaration: a healthy city is a city for all its citizens: inclusive, supportive, sensitive and responsive to their diverse needs and expectations; a healthy city provides conditions and opportunities that encourage, enable and support healthy lifestyles for people of all social groups and ages: a healthy city offers a physical and built environment that encourages, enables and support health, recreation and well-being, safety, social interaction, accessibility, mobility, a sense of pride and cultural identity; and is responsive to the needs of all its citizens. [10]

Moreover, low-quality housing will not only affect the individual's health, but it could also affect the economy of the inhabitant. Also, health risks such as morbidity are widely related to low-quality housing, and poor health might increase the possibilities of being impoverished, which then can affect the possibilities to improve one's housing.[11]It is established that in the developed world, a healthy urban environment which is sustainable and environmentally friendly has a beneficial impact on human health leading to a decrease in the cost of health care.[12] Therefore, this principle should also concern developing countries because it has an immense impact on the cities.

To understand the importance of a healthy urban environment I am looking at the city of Leon, located in central Mexico. Leon is one of the biggest cities in the country as well as one of the first cities to introduce a Planning Institute and implementing new policies promoted by the federal government. This city is considered a leader in the country regarding urban planning and developing governance arrangements within metropolitan areas.[13] However, some issues impede to achieve a healthy urban environment. One of the policies that the city is applying to diminish the problematic in the city is vertical housing in consolidated neighbourhoods.

Social Housing in Mexico.

In this section, I will focus on the impact of the land tenure system in Mexico and the social housing sector; this is vital to understand the current situation in the country. The land tenure system and the status of social housing have been changing through the years. At the beginning "social housing developments" were just rental housing available only in Mexico City. Then during the 1970s INFONAVIT, National Housing Fund for Workers Institute, was created and the social housing sector was transformed into an uncontrollable construction of "style standard housing" in regulated expansion plans in Mexican cities [14]. Besides, during the decade of the 1980s, the government established the "right to decent and dignified housing" in the article fourth of the Constitution.[15]

Meanwhile, to understand the evolution of land tenure, it is important to define the concept of the ejido. Ejido[16] is a type of land tenure which prevails in Mexico since Pre-Colombian times; it could be roughly explained as communal land. Also, it is necessary to clarify that the definition of ejido, as it is known now, has changed over time due to historical events in Mexico. Ejido land is an essential factor in social housing because a lot of social housing developments are built on ejido land.

In the Constitution of 1917, the aim of the Article 27 was to regulate the redistribution of land and land ownership in Mexico. Ownership of private land was possible but with a size limit, an ejidos were defined as social property. Article 27 established that private land could be expropriated to be redistributed to communities and dissolved large extensions of private properties such as haciendas. Ejidos could not be conveyed, mortgaged, leased or used as collateral for loans [17].

Ejido land is also an essential part of the urban development and urbanisation because of its strategic location; and because ejidos are areas in which low-income population and peasants could afford to live. A substantial number of ejido lands are located at the peripheries in many Mexican cities. Also, these lands at the peripheries were occupied by low-income population or affordable housing developments because most of the time the land is cheaper. Therefore, this land has been transformed into 'urbanised ejido'. These ejido lands started to be rented by their occupants because ejidos were needed to fulfil the demands of space in Mexican cities [18].

Ejido urbanisation was anticipated in the original Article 27 through a mechanism which allowed the government or private sector to acquire ejido. This mechanism consisted in allowed the owner to sell the land as long as the people who wanted to live there were "resourceful for their community". Over time, the misuse of this mechanism allowed those large extensions of ejido to become part of the private market [19].

> The exceptions to Article 27 were multiple. One of them was the 1942. This code included three ways of allowing ejido land use changes: (1) expropriation; (2) permute or exchange; (3) the formation of ejidal urbanization zones.[20]

During the 2000's, president Vicente Fox increased the loans to acquire houses through Infonavit. Also, the private sector got more involved in the social housing market. The main aim of the policy package introduced Fox's term was to bolster housing construction, finance and ownership [21]. The federal government started new program which promoted the acquisition of affordable housing through several agencies by low-income population. During the administration of President Felipe Calderon, the housing policies did not change much. Nevertheless, the complications with low-quality housing and distance from cities centres have been prevalent [22].

> Consumer satisfaction with housing quality is far from what it should be. Regulation is inadequate and inconsistent among all three executive-branch levels of government. [23]

Weak housing procurement and policies have been a trigger for the uncontrollable urban growth because most of the social housing development as mentioned before is built on the peripheries of Mexican cities. One of the main issues has been the "privatisation" of social housing; however, is seen as a way to create jobs and promote the housing market, reducing poverty in the country [24]. The results have not been optimal, creating difficulties which disturb both the population and the cities [25]. Therefore, it is essential to understand the complexities of social housing deeply and to comprehend these complexities through the identification of the main characteristics and problems of this housing sector. During Peña Nieto's term, CONAVI (Comisión Nacional de Vivienda) launched the National Urban and Housing Policy in 2007. This housing policy implemented subsidies program that targets the poor population. The primary objective of this policy was to facilitate and increase the access to housing. The expansion of social housing through these policies and the acquisition of ejido land has been creating a speculative land market and an irrational urban sprawl [26]

Currently, social housing in Mexico is mostly built on the peripheries of the cities. In the last few decades, the developments the average house is built on plots of 100 – 120 square meters in a row. The social housing sector has been transformed into a massive area of "standard style housing"[27] and the city of Leon has these characteristics.

Social Housing in Leon

Concerning social housing in Leon, stakeholders seemed to agree that the problems in the city are complex and challenging to solve. Low density, limited access to mortgages and programs at a governmental level

to acquire credit, and irregular settlements are some of the issues according to the director of IMUVI (Municipal Housing Institute[28]) (A. Rodríguez 2017, personal communication, 9 May).

In 2012, IMPLAN stated critical problems of housing in the city. Some of these problems are closely related to social housing procurement.[29] Among these are:

- Housing public policies are not taking into account the local context.
- There are vacant houses both in the historical central area and on social housing developments of the city.
- The social production of housing is disjointed and with scarce resources.
- Social housing developments are built on distant areas with reduced services, inadequate urban infrastructure, lack of mixed-use and deficient urban design.
- Insufficient support for the production of housing: availability of materials and land, financial aid, support for social development.
- Lack of urban land supply.

Figure 1 Social Housing Development 'Hacienda Los Otates', León, México (Picture by the author)

IMPLAN elaborated a map (Figure 2) in which it shows the location of the housing typology. Traditional SH, Popular SH and Economic SH represent the social housing stock in Leon. Also, it is clear the effect that social housing developments have had on the urban growth. According to an analysis done by the same institution, in Leon almost 45% of the housing stock is formed by the social housing; at the same time, 52.25% of empty houses are located on these developments.

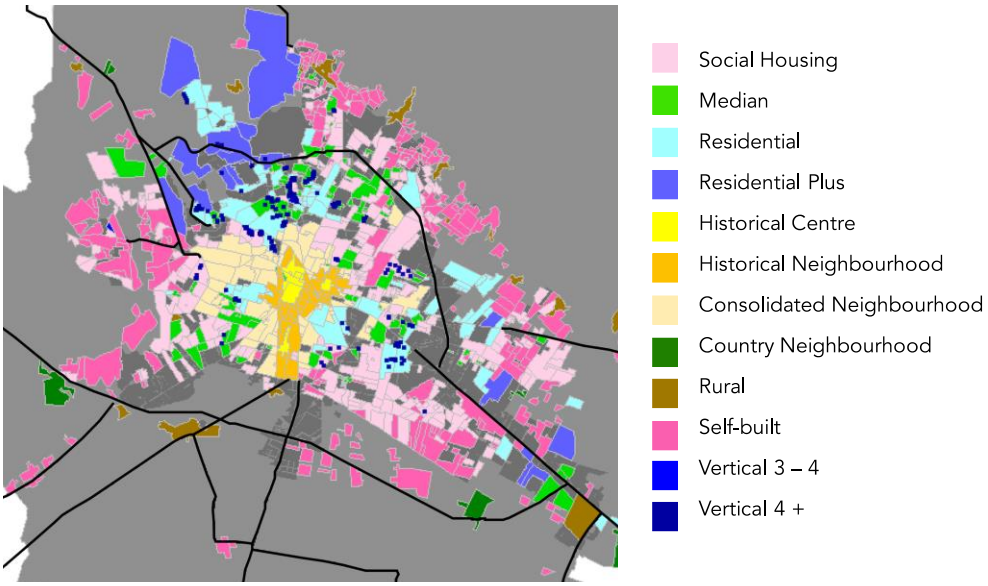

Figure 2 Map of the housing stock in Leon (elaborated by IMPLAN)

One of the strategies that IMUVI has been applying is the 'Vertical housing program' as a response to the problems identified by IMPLAN. This program consists of developments with buildings not taller than six stories built on established neighbourhoods in central areas of the city. This program is specifically targeted only for low-income population working in the informal sector. This program has this unique characteristic because usually the community working in the informal sector, such as taxi drivers, informal market vendors, cannot access a mortgage through a federal agency. They cannot apply because they do not receive a regular salary and are not registered as employees like the ones working on the formal sector.

Besides, another objective of the program is to promote sustainability. IMUVI wants to achieve this through the promotion of building these developments in areas which count with all the services. The focus of sustainability is trying to reduce the remoteness because the "traditional social housing" built on the peripheries have been creating problems which have been difficult to solve; such as the abandonment of these type of housing, vacant plots located on the central area of the city; even then the majority of the social. Housing developments are still built on the outskirts of the city.

In 2014, the first vertical housing development started to be planned during Barbara Botello's term. However, the project had several delays, and it was finished during the term of Hector Lopez Santillana, in 2016. The complex consists of 49 flats, parking area, and communal spaces [30]. This development called Rio Bravo is located on one of the oldest neighbourhoods of the city. The neighbourhood counts with several buses routes, a market, schools, medical centre and it is close to the city centre. According to some of the new residents, they feel much more comfortable and happy because everything they need is nearby.

Figure 3 Occupants of the 'Rio Bravo Development' (Picture by author)

Looking at this project, the 'Rio Bravo Development' and comparing it with the standard peripheral sprawl housing helps to understand the complexities of social housing in Leon and how to improve it through the identification of the factors which might stimulate a healthy urban environment and a sustainable social housing complex.

CONCLUSION

The lack of efficient housing procurement, inadequate enforcement of housing policies and land ownership problems have been causing incontrollable urban expansion, abandonment of houses, land speculation, poor planning, and low-quality housing. Besides, low-quality housing could have an adverse effect on the health of its inhabitants as well on the sense of security and environmental impact; as well, the house should also being of able of adapt to the particular condition of the user[31].

Social housing in Mexico has had many issues during the last few decades that it is hugely important to tackle them. Promoting sustainable strategies and enabling healthy urban environments, the situation could be changed. Leon has been a city of rapid change, but also with a more controllable growth than most of the Mexican cities. However, even with the regulations and programmes promoted by IMPLAN and IMUVI, some of the conditions have to improve; especially regarding policies and efficient implementation.

For example, one of the main issues with the vertical housing program is the limitation of whom could apply to get a flat. IMUVI gives the preference to people earning a certain amount of money per year. Nevertheless, the applicants work in the informal sector. Another complication, observed during a field trip in 2017, was the nonconformity of how the housing complex is administrated. The social issues between the residents have been increasing, and it has been difficult for IMUVI to find a solution.

Nonetheless, this program is a massive step from the typical row single housing developments located on the outskirts. Stakeholders interviewed agreed that the regulations should be stricter. The lack of services and poor infrastructure are causes of ill-health that complicates the creation of healthy urban environments. Therefore, making changes on how social housing could be procured in the city, through the vertical housing program, Leon might have a positive impact and improve the quality of life of its residents.

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INVESTIGATING THE EFFECT OF GREEN WALLS ON STRESS REDUCTION IN URBAN SPACE (CASE: BOOSTAN BLVD. GREEN WALL IN SHIRAZ)

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INTRODUCTION

Today, in urban spaces, we face the lack of vegetation cover more than anything. With the growing number of cities, one of the most important and critical issues in urban space is addressing green spaces and vegetation cover. One of the ways in which it can be done is to use as much green walls as possible in the urban landscape. Green spaces bring joy and tranquility everywhere spaces and thus reduce stress in urban spaces. Because of the lack of space on the horizontal and the right land, these landscapes can be expanded vertically and on the walls of the city and spread to the nature-friendly urban landscape.
The problem that has been addressed in this study is the relationship between anxiety and urban green walls, and how much green space affects the reduction of urban tension in city areas. In terms of the social dimension of the green walls, by integrating nature and building, the beauty of the living environment of the citizens, create and enhance the vitality, contribute to the physical and psychological well-being of the citizens. For this research, the combined method with library research and field studies has been used to collect data. The analysis instrument of measurement in this study was an anxiety test program. The statistical population of this study was citizens on the ground. The statistical sample of this study is one of the Shiraz avenues. The sample size of 30 people was selected randomly from among citizens. It can be said, the design of green spaces affects citizens' stress reduction and in the long run it affects the health of people in the community.

DEFINING THE WALL

The walls are vertical surfaces which define a pathway. The wall is not always a closed surface or a facade of a building. A wall may be:
• A continuous vertical surface without opening.
• A vertical surface with a number of openings.
• Or only a series of verticals (columns or trees), that is transparent with the possibility of visual communication (whether or not it is possible to have spatial association) (Tabatabaei, 2011)

Table 1: Getting to know differences

Knowing the wall	
Based on performance	Based on type of the urban space
Residential wall	Walkway Wall
Commercial wall	Dead end wall
Combination of office and commercial wall	Town street wall
Office wall	Street wall
Ecological wall	Highways wall
	Square wall

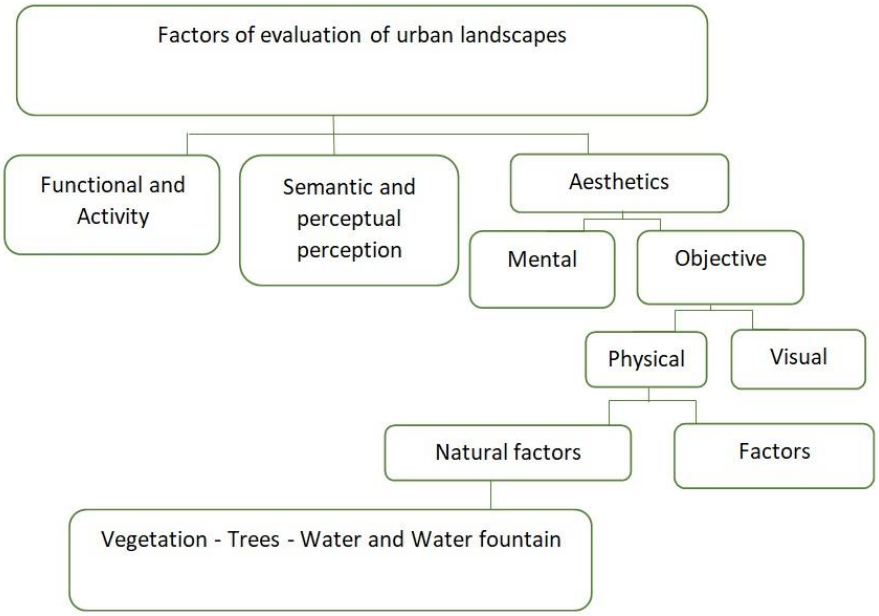

Fig 1: Factors of evaluation of urban landscapes (Source: Author)
Pes of urban walls (Tabatabaei, 2011, Authors)

Different types of green walls

Green walls are divided into two types.

Green wall (façade)

In this wall, twisted plants are planted on the soil and grow on the existing scaffolding on the wall. The use of these walls is low cost and keeping it easier than the previous one, and these walls are older than the living walls. Green views are now divided into two categories:

- Modular network panel systems
- Cable and wire mesh network

Alive walls (Oxygen producers)

This type is suitable for brilliant interiors and exteriors. In these walls, the root of the tree grows within the wall. The advantage of this wall on the other is that the more variety of plants on the wall can grow. The walls are ready-made and pre-fabricated with the plant in the market and if they do not need to wait

for plant growth. These walls require more care than green ones. Living walls are divided into two categories:

- Inactive live wall
- Active live wall

Green wall plants

In order to select green wall plants, attention is paid to the factors in each region in the first place. For example, severe dry weather, inappropriate water, soil, and so on. But the following points should also be considered publicly:

- Method of implementing the green wall (cable or modular)
- Climatic and ecological conditions of the site including light, temperature, humidity and so on. (Tehran Municipality).

Table 2: Elements of vegetation cover, Source: Authors

Plan element	Features
Trees and Shrubs	Their size, foliage density and shape are factors influencing the selection of these elements in the green space.
Flowers	With their layout, you can add a variety of urban space. They can also be combined with trees and bushes and on grass.
Crawling and climbing plants	These plants are used to enclose walls or facades of buildings, or to cover scaffolds and pavilions, or to cover the land instead of grass in areas where it passes hard.
Hedges	Green fences to protect or divide or set limits.
Grass	The most common type of green space in the city.

Definition of Stress

The combination of these threats in life and in the surrounding environment leads to various psychological pressures on individuals, which is undesirable and threatens the health of the individual. If fear in the long run leads to nervousness and persistent anxiety in people, it creates anxiety and horror that affects all aspects of one's life and affects the person's relationships with the environment. These stresses and stimuli in the environment are accompanied by an action or response that ultimately results in stress (tension or psychological stress). That is, the set of external and internal factors imposes a degree of psychological pressure on the individual and causes him to be stressed. Therefore, fear and anxiety are rooted in this stress or psychological stress (Tehrani, 2011). Responsive stress is normal to the outside world pressures (such as city, workplace, family, etc.) or inside (such as the desire to succeed and being accepted).

Table 3: The Different Views of Theorists Concerning the source of Stress
Source: (Tehrani, 2011)

Theorist	Explanation
Hanse Selye(1980)	Everyone defines stress in his view. The businessman sees it as an economic failure, responsible for air control, as a focus problem, the endocrinologist perceives it as a pure chemical reaction and an athlete as a muscular tension.
Burk P.J.(1998)	Stress is a set of demands that reach beyond the available resources.
Alavi(1998)	Stress is the general set of human reactions to incoherent and unpredictable internal and external factors. This means that stress occurs when internal or external balance disappears.
Dadsetan(1998)	Stress or mental stress is the physical, mental, and chemical response of the body to events that cause fear, excitement, distraction, feelings of danger or anger, and prepare the person to deal with different events.

Karami(2008)	Although stress is usually a reminder of the unpleasant feelings of individuals, but a minimum of it as a provocative factor in life and work, and the desire for progress and competition.
BlueCross &BlueShield(1992)	Stress is a factor that prepares a person for problems that he or she does not recognize or which clearly threatens him.

Stress Approaches

In general, there are four approaches in the definition of stress, (1) stimulus, (2) response, (3) person's perception, (4) internal and external factors, which are presented in (Table 6) to theorists' descriptions of each of these approaches.

Table 4: Different Approaches to Stress
Source: (Tehrani, 2011)

Approach	Theorist	Explanation
Stimulus	Bravan &Campfell(1994)	Stress is something that is imposed from the outside and causes physical and mental impairment.
Response	Selye (1956)	This pattern is based on the general conditions of compromise, stresses the process of response.
Person's Perception	Selye (1956)	Only when one fails to deal with the demands of the peripheral environment, or in other words, there is an inclining between the external situations and the capacity to react objectively or objectively to them, a state of stress and desperation.
Internal and external factors	Selye (1956)	Stress is an external factor that is perceived by a person in a certain space and time. The individual uses his mental defenses to cope with it, and at the same time, automatic biological systems are also linked to these psychological defenses.

An event itself and outside the mind does not have a specific meaning, but it is this person's mind and his assessment of this position, which makes sense (Karami, 2008). Therefore, in the study of stress, three factors play a role in stimulating, responding and perceiving an individual that analyzes and evaluates each one of the bases of studies and provides an appropriate solution for reducing stress (Tehrani, 2011).

City as a Stress Causing Environment

Today, for many people, the city is a densely populated area with a lot of noise and pollution, with the complexity and speed at which it has been distressing. In addition, people in most cities do not care about each other and do not care about each other. City life shows that despite stress-free conditions, life continues. Families are expanding, jobs are maintained, and social facilities are maintained. Since stimuli do not have much power in people's beliefs and humans have the capacity to adapt and overcome (Krupat, 1985).

The Relationship between Stress Factors and Urban Space

Given the importance of stress and the overcoming of this problem, the first step is to identify the set of factors causing stress in the city. In stress assessment, "person" plays a significant role. This is the person who determines what causes stress for him, how much he or she will affect and how he responds to it.

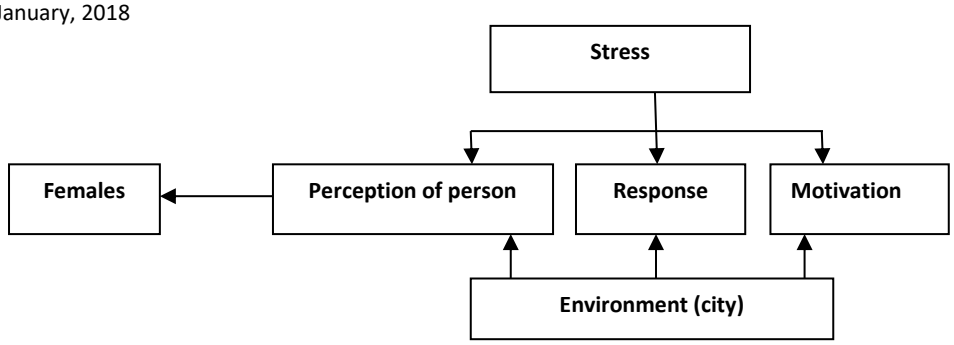

Fig. 2:The Relationship between Stress Factors and Urban Space (Source: Tehrani, 2011)

By studying the views of various theorists on stress in urban space, in addition to the physical characteristics and visual attractions of the environment, quality components such as security and environmental sustainability are also effective in reducing the stress of the public domain.
According to the results of the main points in relation to stress, by theorists and in order to achieve stress reduction in urban spaces with green walls, the main and influential indicators in this study are extracted and studied further.

Table 5: Green Wall Factors
Source: Authors

Factors	Characteristics	Solutions
Environmental	Compatibility with nature	Reducing pollution (weather, sound), climate comfort, attention to the natural landscape
Operational	Satisfaction safety and security Sense of belonging Socialization Identity	Create spaces for walking, sitting, waiting, watching using green spaces Appropriate lighting, boarding activities, multi-functional spaces created by walls Planting indigenous and memorable plants in green vegetation cover Creating a behavioral hub through good shadowing, creating airy environments Paying attention to the elements of the Persian landscape, preserving and strengthening the index points with particular vegetation coverings
Aesthetic	Visual diversity Physical diversity Charm	Consecutive views, visual unity, readability, dimensions and proportions, confinement, continuity along the wall Variety in form, dimensions, color, texture of vegetation in the walls, creating diverse details Attention to the body of the green facade, the lighting of the walls, the space sequence

Theory of mental rehab and stress reduction

Researchers agree that natural landscapes and experiences have a positive potential for the satisfaction of individuals and their health, they explain the reasons for it with two theories that are being discussed in parallel. (Hartig& Evans, 1993). The theory of the importance of direct attention to nature and the theory of stress reduction are among those. In the theory of the importance of direct attention to nature, the relationship with nature leads to mental rejuvenation along with reflexive focus and practical human capabilities. In the theory of reducing stress, travel to pleasant and relaxed environments reduces and even depletes stress. Natural environments are ideally suited to this restoration or recovery of focus

(Hartig et al., 2003). It has been shown in many studies that people who have been shown scenes of nature, are more flexible in their stress and can rebuild their minds much faster (Wells & Evans, 2003)

CASE STUDY

The case study of this study is Shiraz Boostan Blvd. This boulevard is located between Delgosha Street and Saadi Tomb. On the outskirts of this street, the green walls are designed to create a beautiful view of the urban space of this section. This green wall is located in the highland park of Bostan Boulevard and is located opposite the Delgosha Garden.

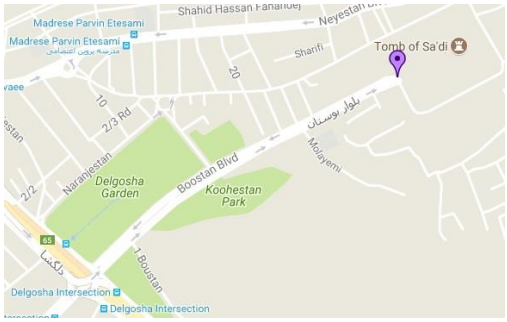

Fig. 3: A map of Boostan Blvd.
Source: Google Maps

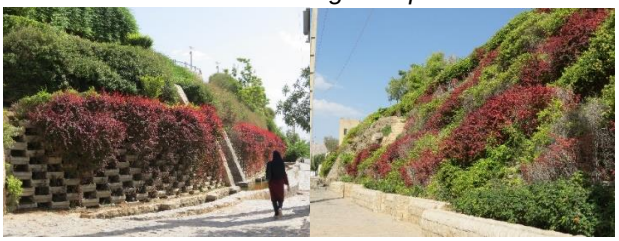

Fig. 4: Green wall of Boostan Blvd. Walkway
Source: Authors

FINDINGS

It seems that green spaces in urban spaces have an effect on reducing the amount of stress in citizens. To confirm temporarily, the above hypothesis, according to the findings of this study, 73.4% of the people surveyed had less stress in urban green space than the green space. Only 26.6% of those surveyed had higher stress in urban green space (Fig. 6), which was higher in women than men, and according to studies, women are more affected by more stimuli in urban environments and individual perceptions in women their stress is much more influential. Findings show that there is a significant relationship between the reduction of stress and green walls in urban space. Therefore, green spaces in urban spaces have an impact on reducing the amount of stress in citizens.

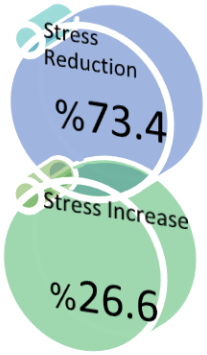

Fig. 5: Results acquired from stress level test in an environment with green walls
Source: Authors

Table 6: Stress level in each of walls
Source: Authors

Age	Gender	Number	Percentage of interviewees	Stress level in green wall environment	Stress level in environment without green wall
20-30	Female	8	26.6%	133	134
20-30	Male	5	16.6%	71	40
31-40	Female	6	20%	240	286
31-40	Male	6	20%	143	111
41-50	Female	2	6.66%	39	50
41-50	Male	2	6.66%	38	26

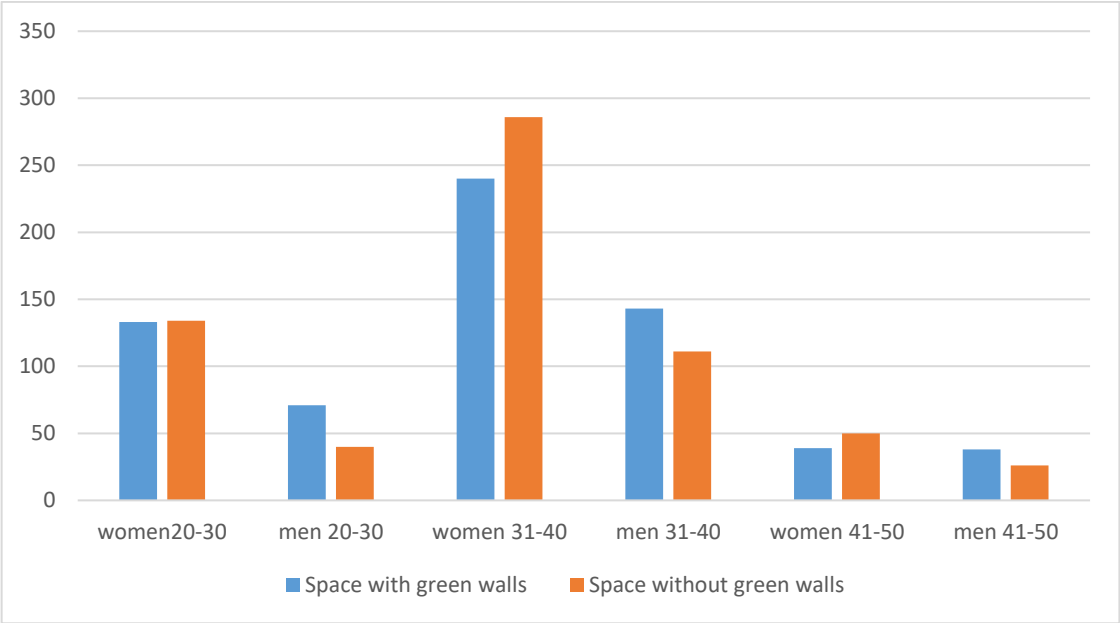

Fig. 6: Stress level comparison in each wall of the research
Source: authors

According to the findings of this study, only 26.6% of the subjects were more stressed in the vicinity of the green wall. The rate of stress increase was 5.7% on average for those who have been stressed. Of the 26.6% of the people who had higher stress levels in the vicinity of the grass wall, 16.6% were female and 10% male and the rest of the people in the green space were stressed, according to findings, 40% of women and 33.3% of men Stress (Figure 7).

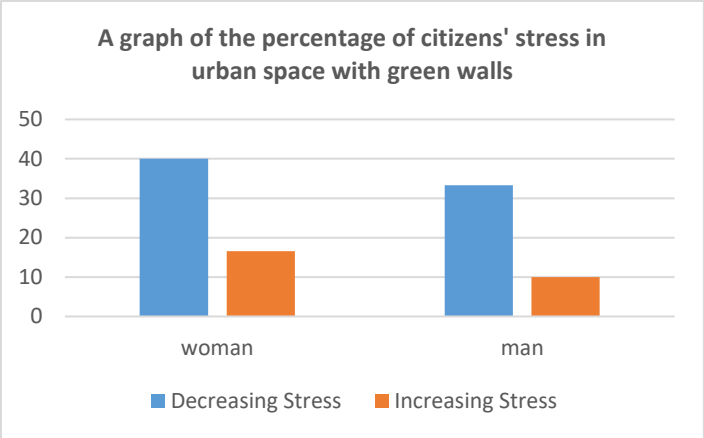

Fig. 7: Citizen's stress level in urban space with green wall
Source: Authors

CONCLUSION

Considering the results of this study, we find the importance of creating green spaces in urban spaces and their impact on reducing stress. Many factors have an impact on stress. However, according to the measure taken in this study, those who are in the vicinity of urban green spaces are less stressed than they are in a green-free space. As a result, the design of green spaces affects citizens' stress reduction and in the long run it affects the health of people in the community. According to the research findings, 73.4 percent of the people surveyed in the urban space of Bostan Street, Shiraz, in the vicinity of the green wall, have been stressed. It should be noted that the issues studied are very different in terms of location and time, and include a wide range of modifiable factors. Only by doing this research cannot be definite instructions for all urban spaces.

Table 7: Pause help reduce stress in urban space with green wall
Source: authors

Guidelines	Explanations
Scale and confinement	Avoid sudden changes in the amount of enclosure and the scale of the greenery that leads to space surprises.
Safety	In the space of the city space, green spaces with unconventional shapes and proportions that induce feeling of imbalance and lack of physical stability are avoided. Green walls should have no hidden corners, so that they do not create a sense of stress in the citizens.
Pause	Urban areas with green spaces should have a space to stand and sit (pause) and not be the only route for passage of citizens.
Accessibility	Access has been defined and preventing the entry and movement of vehicles.
Visual Connection	The vegetation cover does not block the visibility of the pavement and urban space.

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HEALTH AND URBAN PLANNING. ATTEMPTS AT DISCIPLINARY INTEGRATION AND INNOVATION

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INTRODUCTION

Important challenges for global health are being faced in the twenty-first century. The decisions that local governments should make with reference to housing, food, water, energy, transport, social services, and health care affect the health, well-being, and safety of urban populations, pushing the medical disciplines to rethink their approaches to disease prevention. An important response to these challenges according to some scholars lies in urban planning, which can contribute to reducing non-transmittable diseases (Billie Giles-Corti et al., 2016).

It is not by chance that the WHO (World Health Organization) recommends "...placing health and health equity at the heart of [city] governance and planning" (CSDH, 2008) and that in the UN's Sustainable Development Goal 11—"to make cities and human settlements inclusive, safe, resilient and sustainable by 2030"—road safety, public transport, air quality, and safe, inclusive, and accessible green and public places receive special mention (UN, 2015).

It is clear that the effects of urban spaces on health can be both negative and positive. In many European countries and beyond, the assessment of such effects is entrusted to a specific tool that is sometimes integrated in the tools of urban planning. This is the HIA (Health Impact Assessment), which is designed to assess the choices made in plans and projects, correct them or direct their activation in the name of health and well-being of the people, contributing to developing a performance-based approach in designing spaces for living.

While the first applications of the HIA began in Europe starting in the 1980s, it was officially introduced with the Gothenburg consensus in 1999.

For nearly a decade, the HIA was standard practice in assessing policies, plans, and projects, especially in the United Kingdom, Finland, Netherlands, and Denmark, and recently in an experimental way, also in other countries such as France, Italy, etc.

It is one of the central themes in phase IV (2003–2008) of the European "Healthy Cities" network, used to evaluate the impacts on health of projects, plans, and policies and to provide recommendations on how to reduce risks, promote benefits, and monitor the effects on the health of city inhabitants over time.

Despite growing interest in the HIA, in a recent article published in Journal of Environmental Planning and Management entitled "Environmental Health in the complex city: a coevolutionary approach" (Verbeek and Boelens, 2016), the authors debate the complexity of relationships between urban planning and health, highlight the current difficulty in integrating them, and identify three areas of weakness.

The first element regards the dynamics of spatial transformations for which impact assessments are often shown to be obsolete and incapable of dealing with the continuous, accelerated evolution of urban phenomena.

The second element regards the difficulty of understanding the assessment processes. The HIA (but also the EIA and the SEA) are be "black boxes" because they rely on specialist language that exacerbates the

gap between experts in the different disciplines involved and between experts and citizens.[12]
The third element regards a lack of consideration for the social determinants of health. Impact assessments in general do not consider problems of health and well-being systematically, nor do they recognize the complex interrelationships between health and the social and environmental conditions and spaces of life.
This contribution identifies the basic "conditions" such that the HIA can favour the approach of the urban-planning discipline to themes of health and well-being; it also identifies the gaps that need to be bridged.

COMPARING EXPERIENCES

The experiences addressed in this contribution refer to some European experimentation with local planning using the HIA and assessment processes that cannot properly be classified as HIA, but which share the same goals. Particular reference is made to some cities—Rennes, Ljubljana, Pécs, Belfast—and to two experiences made on the inter-city and regional scale but which are directed at the local scale of territorial government—Kajaanin in Finland and the Friuli-Venezia Giulia Region in Italy, respectively. The frame of reference is not uniform. In some cases, an assessment of the effects of urban-planning policies, plans, and projects on health is due to the existence at the national level of laws and regulations that have established content (Belfast and the district of Kajaanin). In other cases, attention is due to the alliance among different sectors of public administration that has favoured the construction of documents to direct initial experimentation in the field (Rennes and the Italian Region of Friuli-Venezia Giulia). Finally, in other cases, interest was determined by the existence, while following documented experiences, of the growing cultural mobilization of local communities, technicians, and public administrations to approach the theme (Pécs and Ljubljana).

Belfast

Starting in 2000, Northern Ireland introduced the HIA tool as support to assess the impacts of planning choices on health. The Institute of Public Health has published numerous reports providing indications to carry out the assessment. The use of the HIA has persisted because it is deemed a useful tool for reducing health inequalities, for example, by raising the awareness of public decision-makers about the different needs of citizens regarding health-related services.
The City of Belfast represents a best practice for Northern Ireland. For many years, this city has experimented with the integration of health and well-being within urban-planning processes, proposing innovative approaches (Belfast Healthy City, 2013). Belfast Healthy Cities, supported by the Institute of Public Health, has introduced and experimented with the HIA methodology on numerous programs and projects, such as the regeneration project for the Connswater Community Greenway. The intervention, situated in the eastern zone of the city, established the creation of a linear park equipped with services, bike and walking paths, and recreational activities with the general scope of improving the health and well-being of citizens, community cohesion, and the urban environment. The park responds to environmental ecological requests and acts as a catalyst for city development from the social and economic points of view. The Connswater Community Greenway project (Connswater Commmunity Greenway, 2012) was subject to an HIA to evaluate the potential effects on the health of the citizens. The impacts were analysed considering the main themes and major material and immaterial interventions of the project using evaluation techniques based on data and information already available or easily accessible and through consultation with interested parties via participatory workshops.
The results came together in the assessment sheets, which were refined with the participation of the local community through events for consultation. The actors involved during the participatory workshop

provided suggestions about how to address potential impacts on physical/mental health and well-being in the medium and long terms, and on ways to expand the potential effects of the project.

District of Kajaanin (Finland)

In 1999, the Finnish Ministry of Social Affairs and Health published a manual on assessing social and health impacts, introducing the term "Human Impact Assessment" in order to unite the different areas of assessment (Kauppinen, 2002). The HuIA (Human Impact Assessment) is a tool to be used in decision-making processes to assess the effects that given strategic projects, plans, or programs have on human health and well-being. It combines the HIA (Health Impact Assessment) and the SIA (Social Impact Assessment) and is applied to all levels of territorial government. In the Finnish Healthy Cities network, the integration of the HuIA in the local decision-making process is identified not only as a priority, but also as an essential component of any city strategy tied to welfare. The district of Kajaani represents a best practice for Finland.

In 2003, this district, located in the Province Oulu and forming part of the Kainuu Region, decided to apply the HuIA to carry out the welfare strategy in all planning documents. The debate centred on the specific model of HuIA to consider.

Three models were compared: Model 0 (a sectored legislation-based model); Model 1 (a sector-based combination model); and Model 2 (a client-based model) (Kauppinen & Nelimarkka, 2005).[3] The impact of each model was assessed with respect to the different population targets (elderly people, children, workers, teachers, etc.) and in reference to pursuing the following objectives:

- complete the welfare strategies for the district of Kajaani;
- make operational the plan of action to support policies to promote health and well-being;
- support planning of the management model for Kainuu region.

The process to construct the HuIA also worked to increase empowerment of the local community, which participated in the strategic planning process. All the various decision-makers were involved in the process, helping to select the best alternatives. The HuIA was made available to the Kainuu Regional Pilot Project in its own planning activities.[4]

Rennes

In France, following several national reforms regarding the environmental assessment of projects and plans that require the consultation of the Health Authorities (*Autorité de santé*, As), increasing numbers of urban policies and projects have been subjected to evaluation of their possible impacts on the environment and on health.[5]

One of the most active cities in France is Rennes.

In 2015 Rennes became a metropolitan city and, faced with high demographic growth, had to provide urban-planning tools capable of addressing new socio-demographic and economic needs. To this end, three documents were drafted: the Territorial Coherence Plan (*Schéma di Cohérence Territoriale*, SCoT), the Piano Local Habitat Plan (*Programme Local de l'Habitat*, PLH), and the Urban Transport Plan (*Plan de Déplacements Urbains*, PDU), whose main objectives were to contain urban expansion by designing natural spaces and prioritizing alternative and multi-modal transport. The objectives of the three documents fall under the broader goal of making Rennes an inclusive, sustainable city (*Cité solidaire et durable*). In 1990, the city joined the WHO's Healthy Cities network. The precociousness of the City of Rennes in terms of planning and health with respect to the broader French context, is closely tied to the territorial presence of the Health and Sustainable Development Association (*Santé et Développement Durable*, S2D), which coordinates the French section of the WHO's Healthy Cities network, pursuing the objectives of phase VI of the program. This is accompanied by the presence of

the School of Public Health (*Ecole des Hautes Etudes en Santé Publique*, EHESP), which has promoted a working group on the theme of interaction between urban planning and health since 2006. Recourse to the HIA has taken this favourable climate to heart and the city used it for the first time in 2009 to design the renewal of the Pontchaillou train station. On this occasion, the assessment was carried out with the support of a directory committee (*Comité de pilotage*, CoPIL) to coordinate city workers with those responsible for urban planning and the health of the city, and a technical working group (*Comité technique*, CoTECH), responsible for activating the HIA. Although the process to involve citizens was difficult, the HIA for Pontchaillou is very rich with active players, many of whom have pursued their collaboration with the institution of the Brittany Healthy Cities Network (*Réseau Bretagne Urbanisme Santé*, RBUS). The formation of this network is perhaps one of the most important results reached using the HIA (Tollec et al.2013; Tollec, 2011)[67]

Some critical points have emerged from the application of the HIA. In the first place, the actors in the process have revealed that while the intersectoral approach is one of the most important aspects for the validity of the HIA, it requires great effort in coordination and cooperation among the actors and the need to develop a common vocabulary between "health operators and planners" and vice versa. Another difficulty highlighted by the stakeholders regards access to information, which is often difficult to gather, compromising the quality of the process and the results.

The experience of Friuli-Venezia Giulia (Italy)

In Italy, the HIA (*Valutazione di Impatto sulla Salute*, VIS) began to be discussed and addressed. Some applications were made in the field and different legislative initiatives were undertaken on the national and regional levels, which culminated in 2016 with the final project document “Linee Guida VIS" [HIA Guidelines]. Already in 2009, however, some Regions had begun initial experimentation. Among the most active was the Region of Friuli-Venezia Giulia, which, with the Central Directorate for Health and Social Protection (*Direzione Centrale Salute e Protezione Sociale*), constituted a technical working group on urban and territorial planning as a promoter of health. A Guiding Document (*Documento di Indirizzo*) was drafted that inspired different proposals, which, while not framed within the HIA procedure, had the merit of activating the promotion of health and well-being of citizens within urban areas through recourse to assessment methodologies that established a network of alliances among different sectors of the public administration and experts in the various disciplines. The first proposal was the Guiding Document "Mobilità sostenibile e sicurezza in ambito urbano" [Sustainable Mobility and Safety in the Urban Area] (Regione Autonoma Friuli-Venezia Giulia, 2009), promoted by the regional health management together with the National Association of Italian Municipalities (*Associazione nazionale comuni italiani*, ANCI). This document represents the result of an institutional and interdisciplinary working table based on the exchange of data, information, and experiences between subjects and the various sectors. An applied checklist was developed based on the health indicators emerging from the working table. The proposal of the checklist is inspired by the need to give municipalities a tool that was easy and practical to assess the proposals for transformation in their territories.[8]

Ljubljana and Pécs

Many cities in Slovenia and Hungary, Ljubljana and Pécs above all, have joined the international Healthy City project promoted by the WHO and have experimented with the HIA on multiple occasions, inserting it as much as possible in urban-planning practice and trying to integrate it with the tools of the EA[9], which have been used for a long time. In this respect, the first attempts were made in Slovenia and the capital starting in 1992. Twenty years later, the experiences were already numerous enough to draw the first conclusions, evaluating the successes and failures of the HIA with a specific conference in 2012:

Capacity Building in Environment and Health. From this and other studies, the major criticalities in applying the HIA in Slovenia can be defined, in particular in Ljubljana, which are briefly (Gibson et al., 2013):[10]

- lack of administrative personnel trained and specialized to prepare an HIA;
- overwhelming prevalence of external consultation;
- lack of national resources and training courses to create experts capable of carrying out an HIA or integrating the theme of health within the EA;
- lack of laws and tools of reference for the HIA;
- absence of national guidelines to apply the HIA and/or for its integration with the EA;
- uncertainty on the role and tasks of the two competent ministers (health and environment) and the National Institute for Public Health.

In the case of Hungary, the experimentation began in 2002, in perhaps a more systematic way, but with still unsatisfactory results. After the training of administrative personnel, the process to apply the HIA was rather problematic for the following reasons (De Blasio et al., 2011):

- detachment and disinterest on behalf of politicians not involved in the training program;
- low motivation of public officials, not stimulated by politicians nor by any requirement to do the HIA;
- untimely reorganization of the administrative machine, with the modification of functions and structures of the departments involved.

In both cases, therefore, it seems that the HIA—as a tool for preventive screening of the plans and projects—can function on par with the EA only if national guidelines are first develop to clarify its preliminary process, and new specific professional figures are formed within the public administration.

CONCLUSION

From the experiences reviewed in this article, some conditions emerge that determine the usefulness of the HIA for the urban planning discipline and some obstacles that are interposed with its effective integration.

The "first condition" regards the existence of "dialogue" between the health sector and the urban planning sector within the public administration. If in the Finnish and Belfast experiences this dialogue is usually reinforced over time due to a certain regulatory framework, in other contexts this dialogue is just beginning and is often represented by the constitution of mixed working groups whose objective is to identify themes for comparison and common languages to design the spaces of the city (Rennes and Italian experiences). In the experiences of Pécs and Lubjana, the obstacles in finding points of contact are identified in the lack of national guidelines and in the lack of interest on behalf of technicians and politicians despite the favourable cultural climate, as evidenced by the subscription of the two cities to the Healthy Cities network.

The second condition regards the effective capacity of the HIA to assess unease present in cities and the expectations of inhabitants, as well as to ultimately contribute to pursuing the performance objectives in planning/regenerating the city and living spaces. In the case of Belfast, the acquisition of this capacity is pursued through permanent consultation with the population based on community planning paths that are applied to all planning and design tools in the city through the organization of numerous activities and events planned in the different phases of preparation and realization of the project and the HIA. This attitude is also beginning to be seen in other contexts, as in the case of the city of Udine (Friuli-Venezia Giulia), where projects have been promoted to raise awareness in the community of themes related to health and to initiate the first shared experiences of co-planning. This is also true in the case of Rennes,

where the HIA has touched many elements of the project for the station, immediately favourable for the health of the population, and others instead that are improved to limit the negative impacts. In other experiences, there is a need for wider application, as in the case of Ljubljana, where the local community's involvement in most assessment processes mostly regards the middle-high social classes for various reasons (mostly tied to the ease of contact and involvement). It has, therefore unfortunately remained outside of a large part of the social fabric, which lives in disadvantaged economic and environmental situations.

REFRENCES

[1] EIA- Environmental Impact Assessment
[2] SEA- Strategic Environmental Assessment
[3] Model 0: the system of assistance proposed provides services conforming to the regulation in specialized areas; Model 1: the system of assistance provides most services required by law both as a specialized area and in service of the community; Model 2: the system of assistance provides specialized services based on the community's requests.
[4] Kainuu Region was chosen by the Finnish government as a pilot region for regional self-government in order to find a way to tackle challenges like, for example, a declining population or the lack of entrepreneurship. Objectives are to obtain experiences on strengthening regional self-government, e.g., organising basic services, citizen participation, and relations between the governmental and regional administrations.
[5] Project decree no. 2011-2019; Decree no. 2012-616 for the environmental assessment of plans/schemes/programs; and Decree no. 2012-995 related to assessing the PLUi, PLU, and SCoT urban plans.
[6] S2D, the Association for the International Promotion of Health and Development, or simply Health for Sustainable Development, is a collaborative body of the WHO that supports the Healthy Cities movement instituted in 1986.
[7] http://rbus-eis.org/
[8] Alliance network involving administrators and professionals in the health world and local administrations.
[9] Environmental Assessment
[10] Environmental Impact Assessment, EIA, and Strategic Environmental Assessment, SEA.

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NEW NEIGHBOURHOOD UTILITY: THE FUTURE OF THE FOOD AXIS

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INTRODUCTION

Group Ginger architects were approached by a land owner to come forward with a number of ideas demonstrating potential solutions for a series of sites in the residential area of Harehills, Leeds. The parcels of land available were associated with the back to back housing typology. Previously used for washing areas, toilets and refuse areas, the land became redundant as plumbing and drainage became integrated into the neighbouring houses. Our approach has looked at how these spaces might once again be utilised as a community benefit, a New Neighbourhood Utility. This paper investigates just one of the potential proposals; the pilot project addresses the future of the food axis.

The 'food axis' is a principal structure about which food related spaces are arranged.[1] It describes the complex network we have created to purchase, consume and dispose of food. Today this axis is almost entirely contained within the family home but historically it was a vivid element of the neighbourhood. Food offers a togetherness that is more inclusive than any other activity. It is something we all share providing a natural centre for the community. Our evolving relationship with food and a renewed environmental awareness and responsibility to waste will inform the new public health paradigm. This paper will trace a history of the home, looking specifically at back to back housing in Leeds and Public Health Initiatives to propose a new neighbourhood utility.

Considering the future of the food axis we ask; can collective action transform waste and waste space into a valuable resource, adding to the quality of life of the neighbourhood, establishing a sense of community/shared activity and contributing to health benefits, food knowledge and general well-being?

LOOKING BACKWARD

The shift from rural to urban life was fuelled by the privatisation of land at the beginning of the 19th century. The acts of enclosure were put in place to drive farming efficiencies without which the growing cities could not be fed.[2] Before enclosure the fields were farmed in strips. The community lived and worked together, sharing rights to common land. Whereas the new farming model saw isolated individual properties and the loss of communal land, leaving a few large landowners and driving the less fortunate villagers to the cities. This marks a significant change in attitude from land farmed collectively for subsistence to land farmed individually for maximum yield and profit.[3] Over the subsequent two centuries this shift in attitude from the collective to the individual has been repeated at a variety of scales throughout a multitude of sectors with success measured by efficiency often at the cost of community and shared activity.

With the population of cities such as Leeds increasing 6 fold through the 19th century, the densification of the city heightened issues of health. Therefore health became a key driver of reform as the Victorians grappled with urbanisation. Furthermore housing was recognised for its detrimental impact on the health of the British working class. However at the end of the 19th century the government had little control over the housing sector with local councils responsible for just 1%. The majority of housing was private rent at 89% and only 10% owner-occupied.[4] This section identifies a number of initiatives at the scale of the city and the neighbourhood.

And at the city scale the Parks Movement made green space accessible to the masses in the heart of the urban environment. Changes in legislation from central government were crucial in allowing councils to provide more public parks with the Open Spaces Act 1877 and Disused Burial Grounds Act 1884 which prohibited use of such areas as building sites. This acquisition of land throughout urban centres came at a cost but "the most expensive plot of land converted into this purpose cannot but be a good speculation, for the health of large towns is one of the utmost importance"[5]. Similarly Earl of Meath implores his contemporaries to see the value of communal space at the General Architectural Congress of 1900, "if landowners will only realise that the value of building land rises in proportion to the amount of timbered open space adjoining it."[6] Here the collective benefit of an asset is up against individual profit.

Waste is a relatively new phenomenon. In the first instance packaging was developed in response to the growing obsession with hygiene as knowledge of germs and food safety became understood. Just 150 years ago 90% of household waste was ash from coal fires.[7] The 1875 Public Health Act required every household to own a 'dust' bin, the origin of the term dustbin man.[8] This was the beginnings of a city wide infrastructure for waste disposal but the dust was not simply dumped. The dust from the coal fires was reused as a key component in brick manufacturing. Similarly within the home, food scraps such as bones or vegetable peels would be boiled up to create a stock for further meals. The peels then became feed for the pigs and the bones were sold, not given, to the rag and bone man.[9] Value was seen and exploited in everything, this stands in stark contrast to the throwaway society of today.

For many working class families minimal domestic cooking and washing facilities within the home forced reliance on neighbourhood amenities; utilising the local bakehouse, public baths and washhouses. The back to back housing typology formed 71% of the housing stock in Leeds in 1886.[10] These terraces benefitted from shared spaces which provided a number of utility functions including toilets, washing and drying areas and latterly refuse areas. This meant that people spent more time outside of the home, maximising opportunity for social interaction with neighbours on a regular basis.

Flushing toilets, mains sewers and waste collections were breakthroughs in public health. The Victorian health movement represents a preventative attitude towards healthcare where investment in the design of the home, the neighbourhood and the city could create a healthier environment to nurture a healthier community therefore reducing the number of people requiring curative healthcare in the future.

EVOLUTION

At the turn of the 20th century, early modernist writings questioned whether the kitchen belonged within the domestic sphere of the home at all, pointing towards a new communal. In A Modern Utopia, first published in 1905, H G Wells projects a future vision of the home "…the ordinary utopian would no more think of a special private kitchen for his dinners than he would think of a private flour mill or dairy farm."[11]

Housing became recognised as an issue the government had a responsibility to respond to with the Housing of the Working Classes Act 1890 and 1900 which empowered local authorities to buy land in order to develop and rent to working people at affordable cost. "The planning of a workman's cottage is of paramount importance to the health and well-being of the community as a whole; and this, one is glad to think, is now being recognised."[12] The planning of the garden city recognised food as a vital element. The fictional future of Wells was brought to life in the homes within Meadow Way Green and Homesgarth at Letchworth. These communities shared communal kitchens and common gardens for food production described by Parham as "socialised food features,"[13] utilising the land for the benefit of the whole rather than the individual.

However the drive for independence came to dominate 20th century design and the home became a private space for the nuclear family, a departure from the household as a community. Two opposing developments in the food axis became clear. The availability of convenience foods removed the necessity of cooking, transforming it into an activity of leisure, entertainment and performance. On the other hand the complexity of cooking is reduced through the proliferation of convenience foods leading to a disconnection between people and where our food comes from. This meant the kitchen

was transformed into a symbol of wealth, devoid of almost all function. Similarly Maak speaks of the dining table as a relic of the communal household with each house owning a table surrounded by empty chairs for all but a few moments each year.[14]

THE CURRENT CHRONIC CONDITION

Food has been divorced from the routine of everyday. Food has become leisure. Carolyn Steel, author of Hungry City, argues that festival market places such as Borough Market are a "manifestation of our overwhelming disconnection with food in Britain not the opposite."[15] It is a form of food tourism removed from daily routine. Borough draws over 70 gourmet food importers and organic farmer. London tourist association states "London's Larder' has tended towards more up market and exotic produce, and with prices to match."[16] Our lack of food knowledge and disconnection with food production has led to the generation of 7.3 million tonnes of food per year by households in the UK for 2015.[17] This is the equivalent to 112.6 kg per year for each person in the UK, or just over 0.3 kg per person per day. The impact on health is equally concerning. The current condition is of increasing obesity, nutrition deprivation, and a resultant pressure on the National Health Service at the end of the cycle. It is reactionary, working to help people get better rather than the alternative of preserving health through preventative initiatives.

Many of the shared community facilities provided as part of the public health initiatives have been personalised, and moved into the private domain of the home. The home has come to encompass everything; cooking, washing and even shopping delivered to the doorstep. Consequently the sense of neighbourhood is reduced to post code real estate. The advancements in technology which have allowed for this convenient lifestyle have unwittingly contributed to social isolation, a real threat to health.

At the same time cities are intensifying, with increasing numbers of people seeking to live in the city, there is increasing pressure on space in cities. We have known for a long time that the world is not big enough for everyone to have their little bit be that; One acre and security or five acres and independence. A new aspiration is needed. In 2012 New York City turned to Micro units in an attempt to solve the housing shortage and accommodate the increasing number of singles.[18] Developers in London are prototyping micro living; 21smq for a one bedroom flat, 40% of the size of the standard accommodation.[19] This reduction squeezes existing space standards and acknowledges essential use. However this vision responds to the drive for independence and rejects the benefits of sharing amenities as a collective.

The final elements to consider are the emerging trends of the 21st century. Health as a popular culture movement has raised it to aspirational status. Although this is frequently exploited through the commodification of health, as an aspiration it is a powerful tool for change. Similarly the Hipster and Craft movement places an emphasis on production. Furthermore there is a generational shift towards greater sense of responsibility for the environment.

A FUTURE NEIGHBOURHOOD MODEL

The increasing pressure on space in cities is leading to a new communal.[20] Combining private retreat with considered communal space, the new neighbourhood model returns to working together. Our future model seeks to reintegrate the food axis into daily ritual by looking at how some spaces that have retreated into the privacy of the home could be replicated with generosity in the common shared domain. Not as a replacement but offering a choice, in essence providing Maak's dining table as a symbol of the new communal neighbourhood. Each home will have access to a table surrounded by chairs occupied by a changing community of actors working collectively.

Our study engages with an area of 96 back to back terraces in Harehills, an inner city area approximately one mile north east of Leeds City Centre. Official Government figures have listed Harehills as – in the top 5% most deprived of England's electoral wards. Unemployment in Harehills is at 9%, compared to less than 4% across the City of Leeds.[21] The twelve streets once benefitted from twelve communal areas which provided for washing and toilets. As plumbing has moved inside the home these spaces have become redundant and subsequently been privatised. These spaces are left to

become anti-social, health hazards; ripe for miss-use. Our client bought the sites at auction for just £1500 to take private control however his interests are community minded. The twelve sites are unfit for conventional development due to the property values in Harehills, making them excellent candidates for appropriation. We have explored what common purpose these spaces might provide which would benefit the community, enhancing their daily existence and offering something that is not sustainable in a private context but which collectively can be justified.

We believe that collective action can transform waste and waste space into a valuable resource, offering environmental, health, economic and social benefits to a deprived neighbourhood. This pilot scheme for the new neighbourhood utility combines waste disposal, energy generation and food production. This combination can provide the full closed-loop food to-energy-to-food cycle. At the same time providing a new social centre for the neighbourhood where interaction is based on production rather than consumption.

In this case the New Neighbourhood Utility will provide an anaerobic digester to process organic waste, creating a nutrient rich fertiliser and bio gas. Managing food waste locally helps to reduce pollution and greenhouse gas emissions associated with waste miles. The fertilizer can be used in the green house and adjacent allotments, providing the potential to grow food all year round, increasing community access to healthy organic produce. Growing food locally is an important educational tool to increase food knowledge and health awareness of diet and nutrition. It can also be used for urban greening programmes to beautify urban areas and contribute to better air quality. Biogas is released during anaerobic digestion and captured for use as a clean fuel which can be used to power CHP (combined heat and power) units, which generates electricity and heat. Energy production could be further enhanced with Photovoltaic panels in the green house roof to provide a further source of electrical power. This power could be sold back to the national grid to offset energy bills of those community members that are part of the cooperative group. Alternatively this power can be utilised to charge an electric car made available to the community via a community car club scheme. By sharing the use of a sustainable electric vehicle, overall car ownership and costs of living can be reduced. There are few areas where the community can come together to help each other, the community room would provide a space for group activities, such as after school clubs, crèche, music clubs etc.

This proposal builds on the work of LEAP (Local Energy ADventure Partnership) micro AD, a cross sector partnership developing micro anaerobic digestion. Their pilot system at Camley Street Natural Park near Kings Cross demonstrates a vision of sustainability and community wellbeing.[22]

If we are genuinely able to introduce a new network of neighbourhood utilities which benefit the community there would be an opportunity to explore grant funding for the initial capital costs. However on- going maintenance costs must be met through the proceeds generated through operation, such that the new social enterprise is not reliant on grant support.

CONCLUSION/MANIFESTO

Change is born of crisis. The state intervened to provide housing and town planning policies when slum conditions could no longer be ignored. The National Health Service was introduced after World War II to address the needs of the nation, healthcare was no longer the privilege of the wealthy. Today the NHS is overburdened and heading towards crisis. There is an urgent need to pursue a more sustainable form of living for all, not just the privileged. This can be secured through design and policy strategies determined to prevent health issues rather than provide medication for the symptoms which result from neglect. Built Environment professionals have a role to play.

We hope to influence and envisage a future where;

· The State will endorse the NNU model on the basis that; the Community demonstrate the ability to organise, manage and operate.

· The Food Axis and other communal public health initiatives are included in the Planning of Cities and supported in development policy

· The State incentivises community infrastructure

· There is a Choice to participate – an opportunity to share in the collective, become an active citizen – this is not exclusive but neither is it an obligation

"How can architects step out of the passive role of actors who sit around like private detectives waiting for a client to come through the door, and become active city builders"[23]
We respond to this challenge by taking responsibility to move beyond hired help. We are engaging in non-violent direct action to change material conditions directly rather than through local governmental politics, which are perceived to have been inadequate. Direct action is a valuable methodology in social movements where people work together, where all share responsibility for future wellbeing. Examples include; Reclaim the Streets and Incredible edible, radical community building in action. As such The New Neighbourhood Utility for Harehills Leeds is a pilot project, a maverick client, a sympathetic architect and an unsuspecting community … who knows where this will end….

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WAITING FOR THE CAR-AGE. WALKABILITY IN SUZHOU INDUSTRIAL PARK, CHINA

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INTRODUCTION

Walking is the simplest form of physical activity and it is influenced by the urban environment. The connection between urban environment and healthy living is increasingly getting attention in China, where new phenomena are emerging:

-the population is aging: the Census 2010 for Suzhou's whole municipality shows the population 0-14 was 18.61% in 1990 and 9.20% in 2010, the population over 65 increased in absolute number, the average natural growth rate in the '50s&'60s was 25,01%, in the '00s was 0,70%;

-the population starts to be overweight: according to the National Physical Fitness Surveillance Stations in 2014 1 out of 3 was overweight in China, more than 1 out of 10 were obese, both in urban and rural areas[1]. According to the 2016 Physical Activity and Fitness in China – The Youth Study 14.4% of children and adolescents 9-17 were overweight, 11.9% were obese, with higher percentages for children living in urban areas than for those living in rural areas[2]. According to the National Science Foundation of China 80% of death is tied to obesity and chronic diseases (cardio-metabolic diseases, diabetes).

This paper explores the impact of urban environment on walking in a wealthy urban case study in China, mainly discussing the dimension of the urban blocks. The paper presents some results of a "research by design" study[3] based on a four steps method:

- selection of the case study due to its relevance in the Chinese urban development (paragraph 1),
- description of the case study, exploring the urban model adopted as reference to understand its design matrix (paragraph 2),
- description of the case study, focusing on the functions and dimensions of the blocks to understand the existing features and the impact on walkability (paragraph 3),
- definition of some transformation of two selected compounds in order to promote walkability considering the World Health Organization target (paragraph 4-5).

A WEALTHY PLACE: MIDDLE CLASS AND CAR OWNERSHIP

Suzhou Industrial Park, SIP[4], 苏州工业园区, is a 288 sqkm expansion of the city of Suzhou, Jiangsu Province[5]. Suzhou is part of the Yangtze River Delta Economic Zone[6], one of China's fastest-growing, and in 2014 had a GDP of 200 billion yuan, approximately the GDP of Austria, and a yearly increase of 8.5%[7]. In 2015 its population was 10,658,000 (in its administrative area, including registered as well as not-registered inhabitants, continuously increasing) with a nominal GDP per capita 41,306 $. According to the Brookings Institute[8] Suzhou is able to concentrate economic activity because it houses the competitiveness assets required to drive global growth.

SIP has greatly contributed to the wealth of Suzhou: in 2014 it accounted for 3.4 percent of the city's land area, 7.4% of the population but contributed 15% of the city's GDP; in fact it attracted 26.7 billion $ in foreign investment for 5,200 programs and 90 Fortune 500 enterprises[9].
With this booming economy Suzhou is becoming a middle class city: in 1990 the average wage was 2.450 yuan, in 2016 79.870 yuan (10.239 € with exchange rate 7.8). Similarly the per capita disposable income of urban household increased: in 1990 2.150 yuan, in 2016: 53.341 yuan[10].
This growing middle-class income allows many to buy a car, an emerging trend in China where car ownership involves less than one third of the families than that in Europe and is more a status symbol than an everyday device. In Suzhou in 2011 the car ownership per urban household was much higher than the average in China 41.45% (in high-income household 66.67%), in 2016 74.3%. To make a comparison in US there were 79.5% vehicles per person in 2015, in Japan 59.1% vehicles per person in 2017. With 2.6 million motor vehicles in 2013, Suzhou had the fifth largest number of motor vehicles among all Chinese cities, and the biggest among all prefecture-level Chinese cities.

THE URBAN MODEL ADOPTED TO CREATE A WEALTHY PLACE

SIP was established in 1994 for an agreement between the Singaporean and the Chinese Government: the Park had to be realized copying Singapore's[11] governance model – i.e. efficient bureaucratic management, attraction of foreign money and talents, stable business environment – and its urban design model – i.e. mainly the priority of infrastructures in the development, together with the zoning, the residential slabs inspired by the Modern Movement, the green corridor idea, the neighborhood unit model[12].
Adopting Singapore as a model, SIP adopts some Western design models, the ones assumed when Singapore became an independent Country, in order to give the new reality an urban identity able to mix West and Asia.
Following the Singaporean industrial park model, SIP is not only a very large industrial area, but a New Town with different land uses on a grid of wide roads, composing some specialized and mono-functional areas such as IT Park, International Science Park, Dushu Lake High Education District, Modern Logistics Centre.
According to Singapore's legacy the main elements of SIP Master Plan are:

- the grid of wide roads defining wide blocks,
- the organization in districts[13],
- the sub-organization in residential neighborhood units to provide equal distribution of public facilities; the idea adopted in Singapore and exported in SIP is connected to the garden suburb model of Raymond Unwin and Barry Parker and to the concept conceived by Clarence Perry for the New York Regional Plan 1929.

400 m: THE NEIGHBOURHOOD UNIT TRANSFORMED IN SIP

In the districts of SIP[14] the neighborhoods units are defined by their neighbourhood centres (NC) and a 400 m service radius from the NC, as prescribed by the original neighbourhood unit concept: in total 22 NC and 3 commercial centres in the first phase.
The implementation of the neighbourhood concept in SIP impacts negatively on everyday walkability for the limited possibility to cross the neighborhood and its dimension related to the dimension of the road grid.
The road system of the neighbourhood unit as conceived by Perry was designed to prevent crossing from people not living in the unit, however it was possible for anyone to to go from one side to the other using inner public roads as the sixth neighbourhood-unit principle "Internal Street System"

declares: «The unit should be provided with a special street system, each highway being proportioned to its probable traffic load, and the street net as a whole being designed to facilitate circulation within the unit and to dis- courage its use by through traffic. Each unit is bounded by wide streets, while the interior system is broken up into shorter highways that do not run uninterruptedly through it and converge upon the community center.»[15]

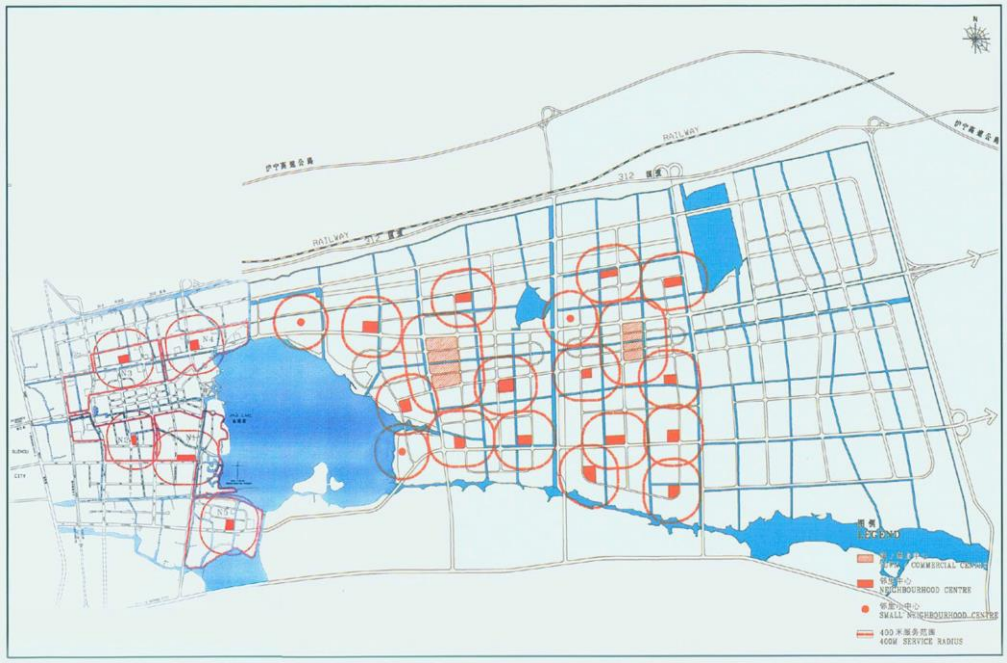

Figure 1. Neighborhood units in SIP, 400 m radius from the NC – source: SIPAC.

In SIP this model has been changed: the crossing is not possible for the fences and gates along the edges of the blocks preventing not residents from entering and using the inner roads, which are classified as "private". According to the Perry model the unit was conceived as composed of several blocks; as an example in the "Apartment house unit" case[16] there are 30 blocks in total with mixed uses[17]. In this "Apartment house unit" layout – the dimensions are 850 m east-west, 570 m north-south – the blocks are irregular in shape and on average not larger than 120x120 m.

On average, the blocks in SIP are much larger than the reference model: in the case study in SIP considered in detail by this research – the Hyde Park compound and Hanlin compound for apartments, which are in total 880 x 550 m, so have approximately the same dimension of the "Apartment house unit" – there are only two blocks, corresponding to more than 24 Cerdà blocks in Barcelona – the city famous for its successful master plan made of blocks.

This wide block, which can be called super-block, is the dominant basic unit of the Chinese urban planning, because its dimension allows rapid urban growth and meets the needs of the government in bringing land to market, in fact the land is either state owned or collectively owned land, so the lease of land must be made in large parcels[18]. This planning method fits perfectly into the almost orthogonal grid of roads designed in SIP according to the dimensions of the neighborhood unit model, that is to say with a rhythm of 400 to 800 m on average.

Figure 2. Xinhu street, main distribution road – photo: the author.

Fences and gates are always realized in all sort of communities in SIP because are required to ensure safety and so increase property values, even though it is not evident what dangers and threats the community must be defended from in a well organized and controlled society such as the Chinese one. This urban environment made of neighborhood units where the parts are completely fenced super-blocks (封闭住宅区 Closed residential Area) strongly impacts the walkability of citizens: the pedestrian as well as the vehicular permeability of the city is drastically reduced, one can only walk along the edges of the block, not cross the area.

This way the area inside the residential blocks, generally designed as a garden with parking, is used exclusively by the local residents, which generally are enough to form what is a village in Europe: if in the Perry's idea the neighborhood size varies from 6,000 to 10,000 people, determined by the population necessary to yield 1,000 to 1,600 elementary school age children, in the case study considered – Hyde park and Hanlin compounds – there are almost 4,800 apartments, one school and almost 15,000 inhabitants.

A NOT HEALTHY UNIT AND THE IMPACT ON WALKABILITY

The research considered in detail two residential compounds selected as exemplary of the general SIP conditions – Hyde Park and Hanlin – in order to describe in detail the problems of dimension and disconnection.

Hyde Park and Hanlin (海德公园, 翰林缘) are two adjacent middle class gated residential compounds, 48.4 ha of surface including the shared NC, which has commercial spaces, an elementary school and a playground, located within 400 m from each edge of the compounds as NC the rule would ask. The open space among the 61 residential high-rises is a sequence of small green areas, parking, little playgrounds, places to rest and stay, water ponds, all connected with organic winding paths.

Hyde Park and Hanlin were defined by the SIP Master plan as a "residential island" between two homogeneous zones, the Dushu Lake High Educational Town to the south and west and the industrial

zone to the north and east. This way the urban context around the compounds is completely mono-functional and over-specialized and offers nothing to everyday life different than what the residential block contains already. If the inhabitants of the compounds do not work there, they have no interest and relation in the education area (where new gates have been installed to protect and contain students) and none in the industrial ones, which are completely fenced as well.
Not only there is no reason of functional exchange, but also a spatial separation: the 2 compounds have no connection to the adjacent northern and eastern blocks for the barrier created by combined and aligned canals and fast roads. So the super-block has only 7 gates for 15.000 people in the western and the southern sides.

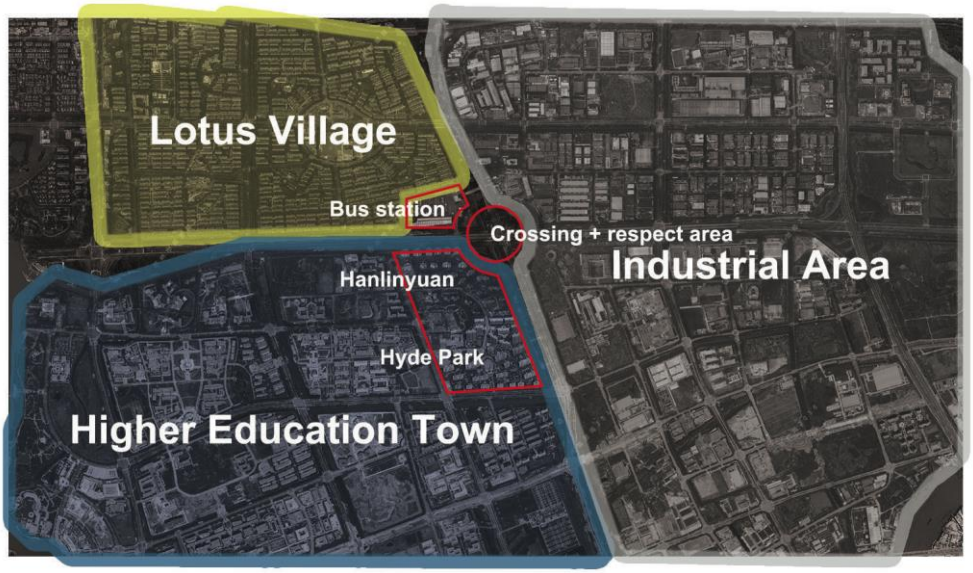

Figure 3. The location of Hyde Park and Hanlin compounds.

Figure 4. The southern border of Hyde Park.

Considering the average travel range of a normal person without a car – walk within 1 km, bike within 4 km – it can be said the structure of the New Town SIP prevents walking outside the compounds:

- the residential area was designed to be a self-contained island where basic everyday needs – grocery and school – can be answered in a radius of 400m,
- the urban pattern is composed of blocks fenced and too large to walk to reach anywhere of interest as blocks are almost mono-functional.

This is in open contradiction to the well-dimensioned space for pedestrian which is everywhere in SIP: almost always the road section includes a wide sidewalk, a lane for bikes and a green strip between them and the carriageway; almost always the sidewalks are connected and decorated with trees and bushes, but direct and constant observation of the site over one year shows a very little percentage of inhabitants go walking and sidewalks are almost always empty.

Figure 5. Sidewalk system getting to Hyde Park and Hanlin from the south.

IMPACTS OF THE PLANNED CAR AGE

Everyday walkability for essential activities is discouraged by the characteristics of the urban environment but is also connected to car ownership and use.

The super-fast massive urbanization in China is planned for the Chinese car-age sustained by the national leadership; SIP is no exception – even though it has the ambition to be a garden city – and the width of the main roads (45-56 m), which structure the urban tissue, declares it and some neighborhoods seem to be "waiting for future traffic" in their today still oversized road system.

The car ownership in Suzhou is getting closer to the ones in developed countries – with an annual car growth of 20% in the past booming years – and so habits of mobility are changing. The share of trips by bike has greatly decreased in China, from 63% in 1986 to 18% in 2009[19]. If the Chinese economy continues to be strong and the government does not restrain car ownership everyday transit options

will be shifting more and more from pedestrian and bicycle oriented modes to car-oriented ones influencing everyday behavior, community practices and individual and public health.
The growing number of cars in Suzhou is causing congestion, pollution and parking problems. Gas emissions from motor vehicles have contributed a greater percentage of total pollutants since 2006[20]. Walkability is connected to air pollution; the urbanization designed for cars causes air pollution, which is planned to be solved in the coming years by law by the Government by allowing only electric vehicles. The average Air Quality Index recorded last year in wintertime in SIP by the dedicated web sites (Air Matters; Kaiterra; AQ Forecast) is much higher than the maximum limit for 24 hours established by WHO and declares it either moderate or unhealthy[21], which means outdoor activities should be limited or are not recommended, especially for sensitive groups.

CONCLUSIONS AND PROPOSALS

SIP urban environment is paradoxical and controversial regarding walkability: it is designed and realized with pedestrian sidewalks along the majority of roads, often decorated and shaded by greenery, but walking is not an habit for the combination of:

- self-contained gated blocks,
- segregation of adjacent blocks,
- large blocks dimension (900 m x 600 m is an usual dimension),
- low grain and diversity of land uses and blocks often mono-functional,
- concentrated shopping areas,
- wide roads crossing residential areas,
- increase of consumption and evolution of mobility habits,
- unhealthy air quality.

To prevent and fight overweight, hypertension, diabetes and help an healthy ageing the World Health Organization promotes walking because it is beneficial against such diseases. WHO defines a target: 10,000 steps a day, equivalent to approximately 7 km. A normal person walks 5,000 steps in everyday life, so other 5,000 steps more are needed to reach the WHO target, approximately 3.5 km[22].
High density settlement with high-rises such as SIP can be transformed to encourage the inhabitants to walk the extra 5000 steps a day which WHO requires; the research by design of this study proposes some transformation which can make the blocks permeable and attractive:

- reduce by subdivision the dimension of the blocks,
- open up the gated compounds,
- decrease the mono-functionality of the blocks,
- connect segmented roads into a continuous network,
- turn parts of the roads not yet used at full capacity into public spaces without cars.

These actions are aligned with the Chinese central government, which recognizes the problem of the super-blocks for the car traffic: on February 2016 it has issued a directive – 步加强城市规划建设管理工作的若干意见 – to open up the gated compounds and connect them to public road system, with the goal to allow the traffic flow to go across the communities and reduce congestion. The directive says:
-no more enclosed residential compounds will be built in principle,
-existing residential and corporate compounds will gradually open up so the interior roads can be put into public use.
In general the intention is to promote and establish a "narrow road, dense urban road network", to contribute to solve the problem of traffic network layout, promote land conservation and better land

utilization. The directive provoked a mounting public outcry[23], because users express concern over the potential risks from opening up the gated communities, including noise and air pollution, traffic congestion and public safety, which is an increasing concern in China.

Figure 6. The action of re-connecting the roads.

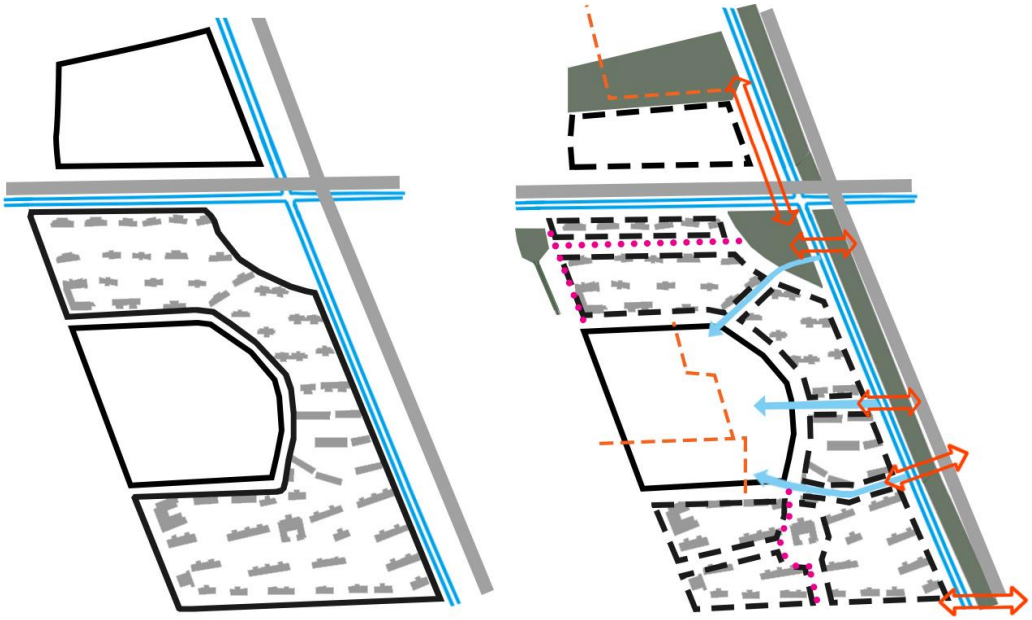

Figure 7. The situation of the super-blocks before and after the transformations proposed.

Downsizing into smaller blocks the compounds and this way opening up the compounds – not only opening new gates, but defining a finer grain of parcelization adapting to the existing inner paths – are feasible solutions for the super-blocks: fences will enclose not the whole compounds, but portions of it, defining a new permeability and introducing proximity shops and activities along the new borders. This way first pedestrians, then bike riders and eventually cars could cross the super-blocks. The dimensions of the inner roads and paths in Hype Park and Hanlin, as the large majority of superblocks with high-rises, would easily allow it[24].

These downsized parts have to remain gated and enclosed for property rights, but especially for cultural reasons: a contemporary reason, safety demand, and an historic reason, the enclosure system is the traditional urban form in China: the ancient introverted courthouse finds a sort of match in the self-contained super-blocks.

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[2] Yujun Cai, Xihe Zhu, Xueping Wu, "Overweight, obesity, and screen-time viewing among Chinese school-aged children: National prevalence estimates from the 2016 Physical Activity and Fitness in China", *Journal of Sport and Health Science*, Vol 6, Iss 4 (2017): 404-409.

[3] The research is done by Dr. Paola Pellegrini and entitled "Learning from SIP: intensify and diversify it" at Xi'an Jiaotong –Liverpool University XJTLU, Urban Planning And Design Department.

[4] All official information about SIP can be found here: http://www.sipac.gov.cn/english/

[5] Suzhou is a second tier city. Chinese cities are classified in tiers according mainly to GDP, political administrative level, population. To have an idea of the tiers see http://multimedia.scmp.com/2016/cities/

[6] Special Economic Zone were established in 1978 for attracting foreign investment and offered tax reduction for corporate income and for imported materials for production. In 1985 three Deltas, including the Yangtze one, were acknowledged as specific economic clusters.

[7] Jeff Desjardins, "35 Chinese Cities With Economies as Big as Countries", accessed November 3, 2017. http://www.visualcapitalist.com/31-chinese-cities-economies-big-countries/

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[9] Official presentation of SIP 苏州工业园区城市规划建设基本情况介绍 by the SIPAC, SIP Administrative Committee; data reported by China Daily, "China-Singapore Suzhou Industrial Park targets new reforms", 28/10/2015 http://www.chinadaily.com.cn/business/2015-10/28/content_22302520.htm

[10] Suzhou statistical yearbooks, accessed December 15, 2017. http://www.sztjj.gov.cn/

[11] The Master plan for urbanization and infrastructure of SIP, plus the Development Guide Plan and the Project Management of the entire work, was designed by the companies Surbana International Consultant, and Jurong International, today Surbana Jurong.

[12] Heng Chye Kiang. *50 Years of Urban Planning in Singapore*. World Scientific Publishing Company, 2016.

[13] In the first phases of the realization of SIP the districts were aligned in a multi centre linear structure organizing the whole development. The multi centre linear structure is realized by the commercial centres, which are distributed in a sequence along an imaginary line connecting SIP to the old town.

[14] The neighborhood unit concept was applied especially especially during SIP first phase.

[15] Clarence Perry, "The Neighborhood Unit", in *Urban Design Reader*, eds. Michael Larice, Elizabeth Mac Donald (Routledge, 2013): 82.

[16] Ibid. 86.

[17] The blocks are: 14 residential blocks, 3 residential blocks plus a public function (2 religious buildings, 1 not defined), 13 public functions areas (school, athletic field, park, 2 playgrounds, central green area, theatre) and commercial or business blocks.

[18] Kjersti Monson, "String Block Vs Superblock. Patterns of Dispersal in China" AD 78,1 (2008): 46-53; David Graham Shane, "Block, Superblock and Megablock, A short history." accessed September 5, 2017. http://www.arcduecitta.it/world/2014/01/block-superblock-and-megablock-a-short-history/

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[22] "Recommended amount of physical activity", World Health Organization, accessed January 20, 2018. http://www.who.int/topics/physical_activity/en/

[23] China Central Television CCTV, China 24 China today News, "Opening up gated communities", accessed November 20, 2017. http://tv.cntv.cn/video/C19140/84d8d1a5c3054d1789c43132ea767807. The central government directive offer suggestions, but how the policy will be implemented depends on local governments and so far the directive was not effective.

[24] The downsizing and opening up of the super-blocks were tested during the Urban Design Module CDE307 (17-18) Learning from SIP: intensify and diversify it, at XJTLU, URBAN PLANNING AND DESIGN DEPT., Dr. Paola Pellegrini, Module leader, Dr. Yina Sima, T.A. Yuan Sun, students: Wenkai Wang, Xuxiong Xiao; Lina Xiang, Feiran Xu, Tong Jiang.

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TOWARDS SUSTAINABLE RURAL DEVELOPMENT IN ARGENTINA

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INTRODUCTION

Sustainability for a community can be defined as the existence of economic, ecological, social, and political conditions that allows the community to function harmoniously over time and space. In rural development, it means improving the quality of life for the rural poorer population by developing capacities that promote community participation, health, education, food security, environmental protection and sustainable economic growth; thereby enabling community members to leave the cycle of poverty and achieve their full potential.

Currently, one of the major challenges that our society faces is the eradication of poverty, which limits the freedom that people have to decide what kind of life they desire. According to data from the Economic Commission for Latin America and the Caribbean (ECLAC), approximately 60% of the region's rural population was in situations of poverty. Moreover, studies show that it is estimated that after the next two decades, the majority of the population living in developing countries will remain rural; thus, the development challenge will remain associated with rural conditions. Consequently, achieving the targets set by the international community, especially in relation to poverty reduction and basic education, will require exceptional emphasis in rural areas.

In Argentina, studies of the proposals for Territorial Rural Development since 1985 show that the actions taken for each focal group were punctual and not integrated into a more comprehensive territorial or regional perspective. Additionally, after analyzing a vast amount of public policies, it is evident that the productive, commercial, and institutional articulation between actors and policies are scarce, and that the continuity and sustainability of the projects developed failed to continue after the economic and institutional support leaves. Simultaneously, the lack of training and transmission of knowledge towards the actors fails to consolidate the social capital needed to oversee the sustainability in time of the projects initiated by the government.

Why is it relevant to focus on rural development?

According to the UN, the world population will grow from 7 300 million in 2017 to 8 500 million in 2030[1]. Thus, in the next 15 years the increase will be 1,2 billion people. Estimates and projections prepared by the Latin American and Caribbean Demographic Center (CELADE) show that in Latin America 80,5% of the population currently lives in urban areas and it is projected that by 2075 this percentage will increase to 90%[2]. It is this form that becomes relevant the phenomenon of rural migration to cities in Argentina[3] and develop development strategies that do not depend exclusively on the concentration of the population in the main cities, which currently collapsing service infrastructures, which provide the opportunity for sustainable growth in intermediate and smaller cities in peri-urban and rural areas.

Sustainability for a community means the existence of economic, ecological, social and political conditions so that it works harmoniously in time and space. In rural development, this means improving the quality of life of people living in poverty in rural areas through the development of skills that promote community participation, health and education, food security, protection of the environment and sustainable economic growth.

Currently, one of the biggest challenges of ours is the eradication of poverty, which limits the freedom that people have to decide what kind of life they want. According to the International Fund for Agricultural Development of Latin America, government efforts have reduced poverty in Latin America from 48,4% in 1990 to 31,4% in 2010 and a fall from 22,6% to 12,3%. % in extreme poverty in the same year. However, if we look more closely at the people who remain in poverty, we find a common pattern: rurality.

According to data from ECLAC, around 60% of the rural population of Latin America is in a situation of poverty[4], this population does not have enough to survive and provide comfort to their social environment, lack of economic resources it is accompanied in most cases by other types of deficiencies, such as education or health, generating more poverty and more difficulties in combating it. On the other hand, a joint study of the United Nations Educational and Cultural Organization (UNESCO), coordinated and edited by David Atchoarena and Lavinia Gasperini[5], shows that in the next two decades, the majority of the population who lives in developing countries is still rural. This means that during this period, the development challenge is related to trends and rural conditions. Consequently, the achievement of sustainable development goals, set by the United Nations Organization, especially in relation to poverty reduction and basic education, will require special emphasis in rural areas.

In addition, the gap between urban and rural poverty has expanded in recent decades and has doubled in rural areas, four times higher when looking at indicators of extreme poverty In turn, it is found that these populations are composed mainly of family providers, who produce for their subsistence and usually lack the financial means due to lack of human capital, limited access to information, technology and unequal distribution of resources. the productive land. Likewise, the lack of infrastructure generates high transport costs that reduce the capacity of people to articulate with more dynamic markets and the possibility of being benefited by social welfare networks and the state provision of public goods.

On the other hand, the active population rate of women in Latin America and the Caribbean in developing countries, is 54% in 2012 (percentage of the female population over 15 years of age, modeled estimation of the ILO)[6]. However, the Rural Poverty Portal indicates that they are the population with the greatest presence in the most extreme poverty groups and that they usually suffer the consequences of internal conflicts, male migration, and structural adjustments. Giving women access to equal opportunities allows them to have a more relevant social and economic role and thus can advance in the formulation of more inclusive policies. In addition, this leads to increased investments in the education, health and general well-being of their children[7].

In Argentina, the proposals for Territorial Rural Development since 1985 were aimed at formulating a rural development program for all of northern Argentina. However, its scope has been limited because the work was limited to groups of poor rural actors. Then, the actions that each group faced were punctual and were not incorporated into a more comprehensive territorial or regional perspective, according to Mabel Manzanal's study on "Rural development in Argentina, a critical perspective"[8].

It is important to consider the rural environment as relevant to a country as the urban environment, but we must be aware that the first of these must be observed in a special way so that it can enhance its intrinsic characteristics and develop without losing its essence. We know that the reality of the rural environment is diverse and varies depending on the geographical and social characteristics of each

region. Focusing on this diversity, the need arises to provide a diagnosis and practical solution, from the field of architecture and urban planning, to the problem of the lack of sustainability in the implementation of public policies to support rural communities.

The theoretical framework

According to David Atchoarena and Lavinia Gasperini, in the publication Education For Rural Development: Towards New Policy Responses[9], poverty reduction, as well as food security and basic education form the core of the new development aid discourse however, the rural nature of these challenges is often overlooked. Poverty in rural areas is closely linked to illiteracy, as well as other forms of deprivation, such as malnutrition, infant mortality and poor access to drinking water. According to these authors, urbanization will not solve the problem and, in fact, it is expected that more than 60% of the poor will continue to live in rural areas of developing countries by 2025. Rural poverty and illiteracy are not only problems of transition or a crisis of adjustment in the process of modernization: they are structural challenges of development.

Atchoarena and Gasperini argue that the vast majority of the poor in rural areas depend on agriculture for their livelihoods. Therefore, rural development faces a key challenge to achieve both poverty reduction and education for all. According to them, the evidence gathered in research, as well as the theories of development, teach us that education is a powerful instrument of economic, social and cultural change. Thus, in order to achieve the Millennium Development Goals, specifically the first two objectives, which focus on halving hunger and poverty and guaranteeing universal primary education, the traditional working methods of the international aid agencies and meet the needs of the largest unattended population in the world - the rural population. This can be achieved through new alliances and multisectoral and interdisciplinary partnerships between aid specialists working in education and those working in agriculture and rural development. By taking the initiative to launch the research leading to this publication, FAO and UNESCO's International Institute for Educational Planning have tried to take a step in that direction.

Finally, although reaching the poor in rural areas may seem more expensive and consume more time than reaching the urban or peri-urban poor, Atchoarena and Gasperini believe that it is a task that can no longer be neglected or postponed. For, if we want to contribute to build a world where peace prevails over war and terrorism and prosperity over poverty, the profitability of international aid for the education of the rural population needs to be analyzed in the long term and as part of a holistic approach.

Mario Lattuada, María Elena Nogueira and Marcos Urcola, in the publication "Three decades of rural development in Argentina"[10], analyze a vast amount of public policies aimed at rural development in the country, and conclude that the productive articulation, commercial and institutional among actors and policies, both at the national and provincial levels, are scarce. Where the continuity and sustainability of most of the projects developed failed to leave the economic and institutional support and could only be maintained in the case of achieving continuity with another program that was created for that purpose. However, in these cases, the variation of technicians and sometimes facilitator, made back the achievements. At the same time, they sustain the lack of training and transmission of knowledge towards the actors, failing to consolidate the social capital that would be in charge of continuing on their own the development activities.

Luis Antonio Traba, in "The new agriculture and the emerging Pampean reterritorialization"[11], maintains that the State does not have the capacity to respond to economic changes because it does not have the necessary new capabilities. In turn, the changes in the agricultural production models caused the urban-urban migration that presented to the public sphere new demands in public policies to attend

to this new social body. It also maintains that the existing legislation is restrictive in terms of providing autonomy for self-management and that a dependence of the assistance type is generated.

The situation in rural Argentina

Mario Lattuada and Hugo Arrillaga, argue that public policies of rural development have no continuity after the economic and technical distancing of the State since social capital is not generated in the target population of these projects. It is in this way that one of the pillars in the sustainable future of rural populations lies in the access to knowledge.

Technological changes generate the adoption of new forms of production, marketing and distribution. Massive or more efficient production in turn reduces the cost of goods and services, making it possible for a larger number of the population to have access to them. The emancipation of repetitive manual tasks brings with it the possibility of channeling mental and physical resources in tasks that require human cognitive capacities that can not be easily automated, such as creativity, thus contributing intrinsically to the technological progress. Jobs linked to manufacturing that involve routine tasks may be prone to be "codifiable" with which human labor would be replaced, this occurs mainly in advanced economies and in upper-middle income countries. The problem with this replacement is that usually new jobs, generated by technological change, require higher cognitive skills than those used in repetitive manual work, so the transition to these positions by displaced workers usually It's not easy. In this way, a certain spectrum of workers is pushed down the salary scale since the demand for less specific skills that can be replaced by technology decreases.

The adoption of technology not only varies among countries, but within them. Another relevant factor is the exponential adoption that some technologies such as cell phones have had, compared to the adoption rate of previous technologies. Mechanization in agriculture also presents delays in the adoption of new technologies due to trade barriers, the relatively low cost of labor compared to the cost of mechanization and a lack of information towards the producers about new technological possibilities or regarding financial aid. In turn, the implementation of new technologies displaces traditional labor and leads to massive migrations from the countryside to the city, causing the depopulation of the territory and generating constraints in the urban areas as they should provide enough jobs to employ the displaced labor.

The role of public policies aimed at the creation of human capital is of vital importance since many times individuals dismiss their importance due to the costs involved, lack of information and social restrictions. Even when education is free, factors such as the cost of materials, the costs and time of transportation and, in some cases, the hours that that person stops working to attend classes and therefore cannot collaborate with the family economy, deter the individuals of pursuing it.

Studies show that people with greater human capital manage to adapt better or faster to technological changes, which means that they are not reluctant to use new technologies in their day to day and working life, and considering the trends in automation, the future will depend on working with the machines and not on fearing them. In the educational level, learning is not defined by the number of years of schooling, but by the quality of education and the assimilated contents assimilated.

Analyzing the differences of scores in the Programme for International Student Assessment (PISA) of 2015 among students who attend schools in towns and large cities, in the area of mathematics we find in Argentina a difference of 49 points and internationally of 29 points; in reading there is a difference of 80 points in Argentina and 37 points internationally; finally in sciences we find in Argentina a difference of 60 points and at the international level of 30 points. These figures reveal that there is almost a 2 years gap of learning between rural and urban schools.

These results are important because, taking into account that the national average is below the score that the Organization for Economic Co-operation and Development (OECD) considers the minimum

learning necessary to develop in a modern society and that the results of non-urban schools are below the national average, together with the migratory tendency from the countryside to the city due to a multiplicity of factors that affect traditional agriculture and livestock such as technification, it makes questionable the fact that people displaced from rural areas can enter the labor market of urban centers without falling necessarily into the irregular economy in order to secure a job and in turn having poor living conditions and ultimately end in poverty.

The Permanent Household Survey (EPH)[12], conducted in 31 urban agglomerates by the National Institute of Statistics and Census of the Argentine Republic (INDEC), corresponding to a total population of 27 593 207 people and 9 015 058 households, presents data on the people under the Poverty Line (LP) and on the income of households, on the basis of which it is established if they can satisfy a set of basic food and non-food needs. In this way, the indicators of the Basic Food Basket are elaborated, and it is extended with non-food goods and services forming the Total Basic Basket, then it is corroborated if the income in the households does not exceed the Total Basic Basket, determining poverty, or if they do not surpass the Basic Food Basket, denoting indigence. The data corresponding to the second half of 2017 indicates that 17,9% of households are below the poverty line and represent 25,7% of the people.

The unemployment rate in Argentina, according to data from the INDEC for the first quarter of 2018 considering the population over 14 years, reaches 9,1% corresponding to the total of 31 urban agglomerates surveyed, denoting an increase of the previous quarter but coinciding with the first quarter of 2017. Within that percentage of unemployment, 2% have incomplete secondary school, 2,7% have completed secondary school and 1,8% have incomplete university and higher education. In this way it is evident that almost 30% of the unemployed population has complete secondary education and almost 20% have incomplete university and higher education. What is more, an analysis by age group shows that of the people between 15 and 29 years old, 31,3% are poor, and between 30 and 64 years old, 21,1% are poor. It can be speculated on whether the reason for unemployment of those who have completed compulsory education is due to the lack of labor supply or if the training received during those years does not prepare individuals to enter the labor market, being possible to support this second theory with the results evidenced in PISA.

Poverty in urban agglomerates in Argentina implies the lack of multiple indicators surveyed by the Permanent Household Survey and are factors to which migrants from rural areas who do not manage to insert themselves in the urban labor market can be exposed. Within the housing characteristics, the quality of housing materials is assessed by: overcrowding, sanitation and the availability of water in the home; in what refers to public services, is assessed: access to running water, gas network and drains sewage; regarding the characteristics of the habitat is probed the proximity to landfills and if it is located in a flooding zone; it also relieves the regime of housing tenure, medical coverage and finally, in regard to education, assistance to educational establishments and the level of education attained.

Surveys[13] reveal that 12,9% of the households have partially insufficient protection from adverse environmental factors and from the natural surrounding due to the quality of construction materials, and that 7,1% of homes have insufficient material quality overall, making up for total of 20% of households and, in the case of people, that percentage rises to 24,5%. Critical overcrowding is considered to be those dwellings in which more than three people live per room and represents 2,6% of households and 5,1% of people, in turn, 14% of households and 21,1% of people live in homes where 2 to 3 people live per room. Regarding sanitation, 14,1% of households and 16.9% of people do not have adequate sanitation, meaning that they have some of the following characteristics: lack of bathroom, presence of bathroom outside of its land, sharing the bathroom with other homes, the bathroom drain is not connected to the public network or to a septic tank, or the bathroom has no water

discharge. Access to public services is also analyzed, where 50,1% of the people and 44,1% of the households do not access one of the services, particularly denoting that 34,3% of the people and 30% of households have no connection to the sewage network, that 33,9% of people and 28,8% of households do not access the gas network, and that 11,7% of people and 10, 4% of households have no connection to the public water network. Regarding the location of the house, 6,3% of homes and 7,7% of people live within a distance of three blocks or less from a dump (approximately 300 meters), and 11,0% of households with 13,2% of people live in areas that have been flooded in the last 12 months. Finally, another important fact is access to medical coverage, where 30% of people are covered only through the public health system, of which 32,1% are in the 18-64-year age bracket.

This shows some percentage relationships in the urban agglomerates surveyed, such as 9,1% of unemployment with 25,7% of people who are below the poverty line, with 30% of the people who depend of the public health system and 24,5% of people who own homes with insufficient quality of materials, together with 44,1% of people who do not have access to one of the public services. These results show that there is a significant amount of the Argentine population that lives in cities, that is unemployed and that does not live in decent conditions or access basic services, presenting a bleak picture regarding quality of life and health for those forced migrants from the countryside to the city.

Regarding the public health system in Argentina, the ratio of doctors and beds available at a national level for every 1000 inhabitants is 3,6 to 3,2, presenting varied regional differences with a ratio of 10,2 to 7,3 in the Autonomous City of Buenos Aires, to 1,2 doctors and 1,1 beds in the province of Misiones[14].

Although the country has one of the highest percentages of investment in public health at the rate of GDP in Latin America, with a value of 8,5% in 2014 according to studies by the World Health Organization and reaching 10,3% in 2017 according to estimations of the Economic Research Institute of the Stock Exchange of Córdoba[15], the distribution and the quality of the service is irregular with respect to the possibility of access of the population, observing "...significant inequities in the results, the level of expenses and in the human and material conditions for effective access to services between different territories and population groups of the country"[16].

The health challenges faced by the country, because of sociodemographic and epidemiological changes, in the implementation and sustainability of health policies have a strong relationship with poverty, being key to approach measures for the improvement of the living conditions of the people. This implies, broadly speaking, a better distribution of health resources in the territory to guarantee access to it and quality of the service, teaching from an early age in subjects related to the area, the monitoring of mandatory vaccinations and programs of control. It is important to emphasize the surveillance and attention of the population that is most vulnerable to diseases due to their living conditions and the lack of access to treatment and information, especially in maternal and child health. For example, with preventive or control programs to combat AIDS, tuberculosis, influenza, dengue, Zika virus, mutations of pathogens and the spread of zoonotic diseases, which can trigger epidemic outbreaks. At the same time, the monitoring of noncommunicable diseases is important, by promoting a healthy diet, an active life and controlling the consumption of tobacco.[17]

The social and environmental determinants have a direct impact on the health of populations, and to overcome the constraints related to poverty, human development projects must be formulated. In this framework, it is important to encourage the creation of participation spaces for strategic decision-making, since the problem must be addressed in a multidisciplinary manner.

The risk of a poor education that does not generate social capital and is translated into unemployment due to the inability to enter the labor market, will lead to that person falling into poverty and ultimately exposed to health risks, intrinsically leading it to depend on an overburdened public system that does not always have the necessary conditions to attend the patients. That is why my thesis

addresses the issue of sustainable rural development from the importance of preparing the population to insert themselves in the current and future labor market, with the aim of generating a virtuous circle in which the adaptation power developed can counteract the current strong trend that leads to poverty and, in this way, improve the quality of life for future generations.

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HEALTH: THE DESIGN, PLANNING AND POLITICS OF HOW AND WHERE WE LIVE
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DESIGNING FOR HEALTH: ANTIDEPRESSANT HOUSES, LEDs SIDE EFFECTS AND HEALING ACCELERATOR HOSPITALS

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INTRODUCTION

The built environment shapes us, human beings. It influences our behaviours, feelings, decisions, health. People spend an average of 90% of their time in and around buildings[1], therefore it is crucial to identify how the users respond to it.

Architecture has always been more than just the art of stacking bricks or providing a sheltered space. Since the Stone Age we can observe constructions that will serve people physically but also psychologically and physiologically. Whether it be done consciously or unconsciously, what humans build reflects culture, society, economics, politics, signs of power, the scale of importance of religious or other beliefs. As for now we are starting to understand that when a building is being designed someone must decide and make choices on behalf and for the users, choices that will condition their architectural embodied experience, impacting their lives, health, well-being and their cognitions. As qualified and talented they can be, professionals in architecture, design and urbanism do not yet have much access to practical techniques and methodology to enable them to know precisely how the building influences its occupants or will influence them at the planning stage.

A new way of thinking Architecture

In the fifties while he was in Italy visiting an old monastery Jonas Salk finally found the vaccine for Polio after struggling in his small, dark, basement laboratory[2]. Convinced that the building had influenced his brain and his mind he asked architect Louis Kahn to work on his new institute, The Salk Institute in La Jolla, California, USA, using this cognitive approach. Although Jonas Salk is supposedly the first to make a parallel between high ceilings and creativity, in the sixties research and theories on architecture mainly converge towards a cultural approach. What we design and the way we behave would be induced by the culture[3]. Between the seventies and eighties William H. Whyte, followed by Jane Jacobs amongst others, introduces a new way of planning with urban sociology, based on the observation of urban life and the study of how people behave and react to the place[4]. In 1969 Rudolf Arnheim appreciates the intrinsic correlation between what we see, what we perceive and think[5]. From the eighties to 2000 are emerging colour psychology, ergonomics, biophilia[6], the use of anthropometry in design[7], the study of space perception; professionals and researchers start to realise more and more that the built environment has a drastic impact on people. Since 2000 and with the help of the revolution of neuroscience, started about fifty years ago we are now able to explain the process of thoughts, behaviours and feelings and we start to apply it theoretically and practically to architecture and urbanism. John P. Eberhard is one of the first to link architecture and neuroscience[8]. Then Harry Francis Mallgrave describes another perspective on the same basis in his book[9]. Whether

it is scientifically based or thought with a different awareness we can witness the emergence of a more human approach-based design, analysing and seeking ways to comply with people's welfare[10] focusing on user's physiological and psychological needs[11]. And very recently our responses to the built environment was identified using a cognitive approach[12], complemented with the cognitive neuroscience, exploring the embodied architectural experience[13].

Human's perception of the built environment

The user's perception and feeling are stronger than design. Architects and urbanists can only suggest how to use the building or which way to take but they cannot control how people will interact with the environment.

Figure 1: Lisa Kilker on Twitter

Obviously, the aim is not to compromise a function or a concept, but it is to create a framework, to think outside the box, considering instinctive, cognitive and socio-cultural aspects.

Sometimes there is a large gap between what we aim to design, what we design, what the users perceive and how they react. We could reduce and even close this gap by observing and learning how people respond to the built environment.

Every visual stimuli are transmitted by the eyes to the brain (in the hippocampal regions for the cognitive site mapping) where the information will be treated[14]. Then, the treatment of this information will generate a stimulation of different part of the brain inducing hormonal secretion, physiological, behavioural and psychological reactions. However, even if our brain processes every given elements, the way it processes them differs depending on the importance and also on the ability we have to make a change to it; When people walk on a street, whether they like it or not, they feel well or uncomfortable, unless moving elsewhere they cannot change their neighbourhood nor their environment, unconsciously they feel powerless towards their visual surrounding; therefore the brain will not classify the information as "deserving much attention". But the feeling created by the place will be there anyway, guiding our behaviour, impacting our health and well-being, making an inner record of our experience.

HEALTHY HOME AND ANTIDEPRESSANT HOUSE

Commonly, a home is "the place where one lives permanently"[15]. It is more than this: it is a place where we feel safe, where we can find peace, intimacy, rest, joy, well-being, etc. When we talk about healthy home we usually understand hazards/toxic concerns[16], air quality[17], practicality and safety. The

list is incomplete, we should add natural light, artificial light, space, textures, volumes, colours, occupancy, noise levels, visual thermoception, materials, shapes, outside views, focal points.
Antidepressants have become a sadly common and widely spread prescribed drugs mainly in Europe[18] and in the United States. The way professionals design dwellings will not eradicate depression, but it can be an important asset to help curing it and maybe even prevent it.
In a healthy house we will look for a good sleep, which plays a big role in depression, biasing mood, affecting memory, attention, food cravings, fitness and energy. To create the best conditions for a good quality of sleep, here are some of the key points we should pay attention to; The place should be filled with natural daylight throughout the whole day (ideally from sunrise to 4 pm). When daylight is not enough, artificial light should be used in a mindful way (see section below on artificial light). The rooms should be ventilated, and the air renewed, natural, and obviously as less polluted as possible. Natural ventilation is always preferable. Concerning colours, it is advised to use cold, soothing colours[19] (preferably dark or light blue) in the bedroom. It will help slow down the heart rate, reduce the body temperature, helping to feel relaxed and in good conditions to induce sleep.
The intimacy is very important in a home. People need to have their own space where they can spend some alone time. Numerous studies have shown that crowded housing has a negative impact on children's well-being and could lead them to behavioural troubles[20] as well as social difficulties.
Inhabitants tends to feel more at ease with soft angles, rounded shapes. Sharp edges are less organic and as biophilic creatures we will perceive them as anxiety provoking forms. In the same register, having a view on trees or more generally on green spaces could lower anxiety, alleviate stress, making people feel better.
A healthy home should not be over stimulating; both clutter and overflow of visual information makes our eyes scan all around permanently sending too many data to our brain. This will require more attention that it should, leaving us restless and always somehow preoccupied. For a cognitive comfort it is better to have one or two focal points where our attention could be drawn to, avoiding fretful room scanning. On the other hand, an under stimulating place could result in boredom, lack of joy and enthusiasm.

Adapting the place to its occupants

Not only should we adapt design to mankind, but also on the very specific humans they are. Every individual is different, have different needs and different perceptions. There is various way of defining a person's cognitive and psychological profile. During personal research I found two main tendencies correlating design and cognitive profile. Focusing on the left and the right sides of the brain: the left being the logical, organising, methodical and rational part and the right being the artistic, creative, spiritual part[21].

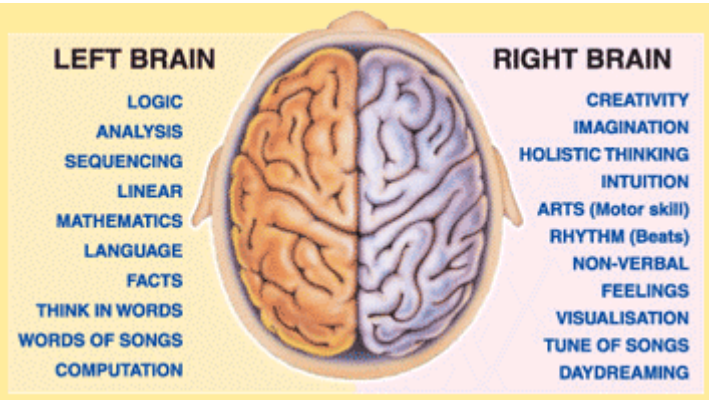

Figure 2 : source : http://www.dkathleticperformance.com

It has been proven that high ceilings make people more creative as well as cold colours. However introverted people will seek security and will find it in enclosed, smaller spaces, with lower ceilings and warmer colours. We could argue that mainly right brain sided people would feel better living in homes with greater space and high ceilings. However, both right and left brains will develop their cognitive capacities in large volumes and find easier to concentrate in slightly more confined spaces, with lower ceilings. As Jonas Salk related, he was able to concentrate in his small laboratory but when he had to be creative and find an innovative solution, it is in a large, opened, inspiring space that he found it.

The correlation between left/right brain and architectural design has yet to be research in more depth, however we could conclude that observing and getting to know the inhabitants would certainly enable professionals to grant them with more appropriate, efficient and adapted design for health and well-being.

Artificial lighting; the side effects of LEDs

Good artificial lighting is key in house designing. In an interior we can paint the walls with the best colour(s), use a nice flooring material and display beautiful furniture and decoration, if the lighting is not appropriate it will not showcase those features. Lights can change the atmosphere. It is not only about the shape and type of the fixture, nor the technical properties of the bulb such as the intensity, colour temperature (Kelvin), colour rendering index (CRI), beam angle, it is also about how we perceive it and respond to it.

While most architects and designers know how to make good aesthetical use of lights, their impact on our life, our behaviour and brain is lacking consideration. As a matter of fact, the light has a strong physiological effect on us; it can influence our sleep, mood, eating habits, mental efficiency, and psychological condition.

The blue rays in indoor lighting can interfere with the circadian rhythm, also known as biological/body clock[22]. Natural daylight produces blue rays, which will fade away as the day goes by and will end up disappearing from the light before sunset. Hence the colour red that we can notice when the sun is setting.

Between all popular artificial lights, LEDs have the highest source of blue ray's emission. The higher in Kelvins (cold white/blue) the lights are, the bluer are the rays they emit. In addition to their harmful effects on retina, blue rays can disturb or even inhibit the production of melatonin. This hormone allows our body to switch in "sleep mode". LEDs are becoming the most widespread source of artificial lighting thanks to their energy saving properties.

Ideally, we should avoid exposure to LEDs or other sources of artificial blue rays after 4 pm, otherwise it may disrupt the circadian cycle, delay the secretion of melatonin and the induction of sleep[23]. Researchers and light manufacturers are working on finding solutions to remove blue rays from LEDs while keeping the quality of light and its aesthetical colour of white/neutral or even cold. In the meantime, we could multiply the sources of artificial lightings, using other light bulbs or warmer white /yellow LEDs below 3000/3500 Kelvin after 4 pm. This is also a good solution to create a warmer and relaxing atmosphere at home as it gives a nicer result to the interior design to have many low power lights rather than a very bright unique one. Furthermore, multiple and diffuse sources of light will rid rooms off dark areas and make it more comfortable to live in.

HEALING ACCELERATOR HOSPITALS

Hospitals, health care centres (General Practitioner, Dentist, waiting rooms, etc) are for most places a source of anxiety. Going to these places is rarely a pleasure, we assimilate them with disease, pain, lack of control and incomprehension. Beyond the conscious reasons there is also the patient's architectural experience playing a role. In fact, medical facilities are designed to be practical with their strong white blinding artificial lighting, the colours they want to keep neutral and light because it gives a clean look, and the furniture that is reduced to a bare minimum. There could be a balance between the necessary uncomfortable features and adding a little human-soothing extra. In the intervention rooms it is important to focus on the technical, but in waiting rooms, recovery rooms some efforts should be done. Not for aesthetic reasons but for the patient's health. Many studies have shown that patients could heal faster enabling them to leave the hospital one day earlier and, they would feel less pain during the recovery, ask for less pain killers. In 1984 Roger Ulrich[24] was the first to identify the parallel between healing acceleration and view on greens from the patient's room. Recently it has been shown that even just a poster of a green landscape has a positive effect on healing.
We could assume that a little more visual cognitive stimulation in the rooms could have a positive impact reducing boredom and diverting attention from medical devices.
The artificial lighting could also be improved, leaving the strong blinding light for examinations and offering patients the possibility to switch to a warmer, blue rays free, softer light while in recovery and in the evening.

Case study: "Yantalo Clinic" (Personal experience: my visit to the clinic as a volunteer)

Figure 3.

The Yantalo Foundation[25] was created by Doctor Luis Marquez, cardiologist whose family is from this little village of Yantalo. It is situated in the Amazonian jungle in the north of Peru. The clinic was built outside the village, in an inviting green landscaped park. As we walk through the driveway we discover a solid, modern, green and white building. It was designed by architect Gil Cooke[26] in a partnership with the University of San Diego as a project with students[27]. The construction started in 2011 and only opened to patients in 2016 due to difficulties encountered with the planning office and site unexpected problems causing delays.

I volunteered for a month for the Yantalo foundation to help design a school for the village. During my stay I had the chance to meet Gil Cooke and have a good insight on the building and its specificities.
The colours of the facades, as well as most of the inside ones were chosen by people from the village of Yantalo. The vast land around the clinic hosts another building with offices and accommodations for volunteers, organic agricultural lands with plantations of trees, coffee, cacao and fruits.
The building is surrounded by trees and green landscape, every patient's room has a window or even an access to the green outdoor. The weather being rainy but warm all year round offers the possibility to have large open spaces. In fact, it is not enclosed, the inside and the outside merge into a green sheltered place. Open railings often replace windows. Inside the building there are two gardens offering a green view wherever we are situated in the clinic.

Figure 4.

Each sections of the building are painted in different bright colours, helping memorising the premises and making the orientation easier and less stressful. The rooms, halls and corridors are very bare but as they are surrounded by nature, very colourful and always with some little special details in every corner (a mirror to reflect the garden behind us, a traditional painting on the wall made by locals, a customised clever folding bench, etc) they are stimulating and inviting. As we walk around the clinic's indoor aisles, it feels like having a nice stroll in a park, until we come across a medical scrub to remind us that we are in a medical facility.

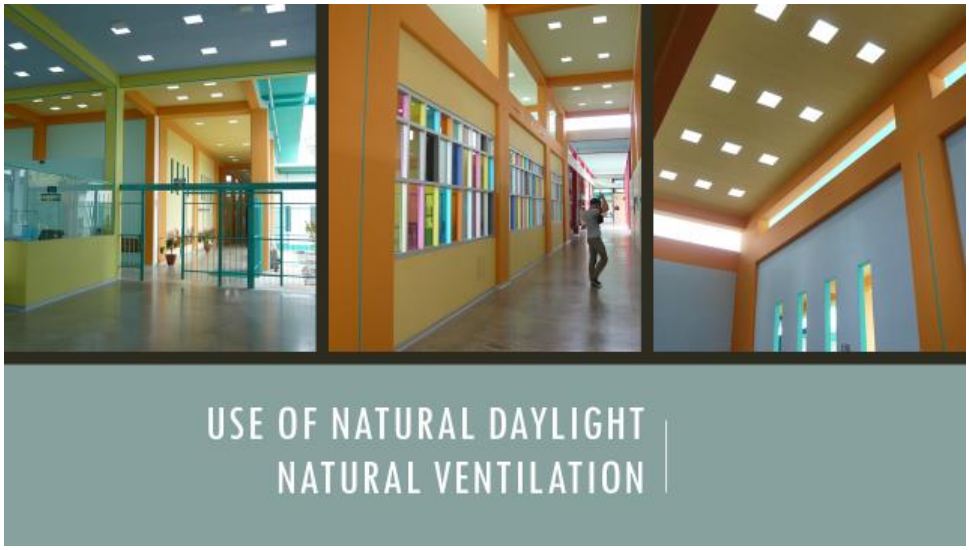

Figure 5.

The clinic is also the first green medical building in the country[28]. Its clever design makes it energy efficient. The high ceilings are perforated with square paving glass looking as if they were lighting fixtures. The artificial light is only used at night and in the laboratories. The building is not equipped with air conditioning. There are openings between the walls and the ceilings, allowing the hot air to escape and leaving the fresher one to get in through the many openings of the edifice. The temperature inside is always cooler than outside.

As the clinic had only been running for a year at the time I was there, with monthly surgical interventions run by volunteer surgeons from the US, we cannot yet appreciate and compare the recovery results specific to the clinic on patient's health.

CONCLUDING REMARKS

Nowadays we must comply with numerous building regulations, produce design that will be rated on thermal and energy efficiency amongst other requirements and awarded mostly on its subjective aesthetics (structure, originality, concept, etc)[29]. Buildings' impact on human health, cognitive functions, behaviour, and well-being is scientifically proven[30], therefore isn't it about time to research a way to include these criteria in the building's design process? And perhaps someday even in the building's regulations or government's requirements? Most of architects and urbanists do not seem to be aware of these impacts, therefore they often give too little (if not none) attention to how people will physiologically and cognitively react to their buildings. This is because people feel powerless towards the built environment[31]; The same way the sky is blue, either we like it or not, whatever it makes us feel, we don't have the capacity to do anything about it, so we look at it without paying critical attention to it and analysing if this blue is appropriate for us or not. It is the same with the built environment. Because people do not (and cannot) demand it, real estate developers and designers don't have to offer it along with their services, consequently they are not trained for, neither aware of it. If they could be alerted of how much the built environment affects them, people would be empowered with the opportunity to ask for a change. Their conscious and unconscious needs are entitled to be heard for a healthier design.

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ANATOMIC CONSIDERATION OF A SAFE HOSPITAL'S ARCHITECTURE IN CASE OF EXTERNAL EMERGENCY

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INTRODUCTION

During recent decades, the scale of disasters has expanded owing to increased rates of urbanization, deforestation, and environmental degradation and to intensifying climate variables such as higher temperatures.[1]

Emergencies can happen in any country, at any time[2], and depending on their scope and nature, disasters can lead to a rapidly increasing service demand that can overwhelm the functional capacity and safety of hospitals and the health-care system at large.[3]

During emergencies or disasters, hospitals and other health facilities must remain safe, accessible and functioning at maximum capacity in order to help save lives.[4] For this reason, all health care facilities need to have internal and external emergency plans made available to staff in an easy to follow format.[5]

These plans, that, also known as "hospital crisis preparedness plan"[6], "all-hazards hospital emergency response plan"[7], "hospital emergency risk management programme"[7], "disaster preparedness plan"[8] or "emergency preparedness plan"[27], aim making hospitals safe and effective, and promoting their resilience.[9,28]

According to disaster and emergency guidelines, "safe hospitals" are health facilities, whose, services remain accessible, and functioning at maximum capacity, within the same infrastructure, during and immediately following disasters, emergencies or crises.[10] In the same manner, hospital resilience, can be defined as "the ability of hospitals to resist, absorb, and respond to the shock of disasters, while maintaining and surging essential health services, and then to recover to its original state or adapt to a new one". [11]

Efficient disaster management plan is considered as an essential way for hospitals to supply continuous health services during disasters;[11] although, there is often a big gap between what was planned and what actually happens in a major emergency,[8] and suffice it to say, disaster plans alone are not effective, unless they are supported by a team of providers, who, have worked together to craft the result.[8]

Functional collapse, not structural damage, is the usual reason for hospitals being put out of service during emergencies; which, occurs when the elements that allow a hospital to operate on a day-to-day basis are unable to perform, because, the disaster has overloaded the system. These elements include: architectural spaces such as laboratories or operating theatres, medical records, medical and support services, and administrative processes.[12]

Hospitals' physical space, is an important consideration[45] and source;[8] which, its deficiency, may limit hospitals functioning at maximum capacity within the same infrastructure.[42] Lack of physical space in hospitals in case of external emergency, can be concerned from several aspects including; surge capacity,[13] negative pressure rooms[45], space for equipment,[14] physical space for inpatient capacity,[3] space for logistical capacity,[6] and other medical and non-medical functions.

Creating safe hospitals means shearing responsibilities[44], and involves everyone.[4] For this reason, in identifying and reducing risk, and building the resilience of communities,[12] determining the vulnerability of hospitals, and addressing these concerns,[4] involvement of the widest possible variety of professionals including; all health disciplines, engineers, architects, managers, maintenance staff, and more, has been recommended in most of emergency-related frameworks. Within recent years, most of disaster-related forums, have addressed the need for guidelines for designing, constructing and evaluating safe and resilient hospitals.[27]

It is possible to minimize the disruption of hospital operations,[37] and reduce the vulnerability of a hospital by raising the level, at which, we protect lives, the investment, and functionality, not only in existing facilities but also in the design of new installations,[32] incorporating mitigation measures in the design of hospitals,[37] as non-structural measures.[22]

This research, is a multi-sectoral study, in which, architecture, emergency medicine, emergency nursing and emergency management issues have been studied in parallel, in order to find results; which, cover deficiency of physical spaces in hospitals in case of external emergencies. In this research, first of all, disasters and emergencies were classified considering several guidelines and researches. Following that, disaster and emergency guidelines and related researches have been studied in order to determine the quality and quantity of required physical spaces in hospitals during emergencies, and to find proper solutions in architectural design process, as mitigation measures. Also, in order to check previous disaster experiences in hospitals, several large-scale disasters' reports, including the most recent earthquake, which, happened in IRAN on November 12, 2017 have been reviewed.

Definition of hazard, disaster, emergency, and crisis

When a critical event happens; that, contains damage, communities may consider it as hazard, disaster, emergency, or crisis. In most of disaster-related literature, these terminologies are used alternatively; so, almost all well-known dictionaries use one term to define another, and the words are used interchangeably.[15]

In this research, same terminologies for critical events; which, authors used in the resources are presented; meanwhile, a simple definition for each of them is presented as following:

Hazard:

Hazard is a source of potential harm, or a situation with a potential to cause loss,[16] and are routinely divided into natural or human-made hazards (Table 1).[17]

Table 1. Types of hazards [18,8,35]

Hazards	
Natural / god-made	**Man-made / human-made / technological**
Geophysical : Earthquakes, landslides, tsunamis and volcanic activity Hydrological : Avalanches and floods Climatological : Extreme temperatures, drought and wildfires Meteorological : Cyclones and storms/wave surges	Complex emergencies/conflicts Famine Displaced populations Industrial accidents Transport accidents Act of terrorism Structural collapse Fire

Biological : Disease epidemics and insect/animal plagues	Civil disturbance Local war Major wars

Disaster:
A disaster is the impact of a natural or human-made hazard, that, negatively affects society or environment;[17] and, occurs when hazards strike in vulnerable areas.[17] Different terms have been used to describe the types of disasters; however, the natural and man-made disasters cover all types of disasters[19] as well as hazards.

Emergency:
Emergency is a state, in which, normal procedures are suspended and extra-ordinary measures are taken in order to avert a disaster.[20] An emergency situation arises suddenly and unexpectedly, and urgently requires immediate action;[21] however, sometimes is used interchangeably with the term "disaster".[22]

Crisis:
A crisis is an abnormal situation, which, presents some extraordinary high risk to business, and will develop into a business, unless carefully managed.[19] A crisis involves many players, and depending on the location and the nature of the event, different agencies and groups take different roles.[23]

Critical events ("hazards", "disasters", "emergencies" and "crises"), that may trigger hospitals, are divided into internal emergencies and external emergencies (Table 2).
In this research, in order to consider the impact of emergencies on hospitals, events, which, are considered as "external emergencies", are studied.

Table 2 . Disasters and emergencies related to hospitals [8,7,31]

Internal emergency (following natural or man-made disaster)	**External emergency (following natural or man-made disaster)**
Occurs within the confines of the hospital, which, puts the hospital at risk and causes interruption of key services in the healthcare facility	Occurs at locations that are physically separate from the hospital, in the community with no notice

Stages of critical events

Disasters are often thought of as happening in a cyclical manner, consisting of four phases including; preparedness, response, recovery, and mitigation[25] (Figure 1); and, social scientists, emergency managers, and public policy makers generally organize both research and guidance around these phases of disaster loss reduction.[24]

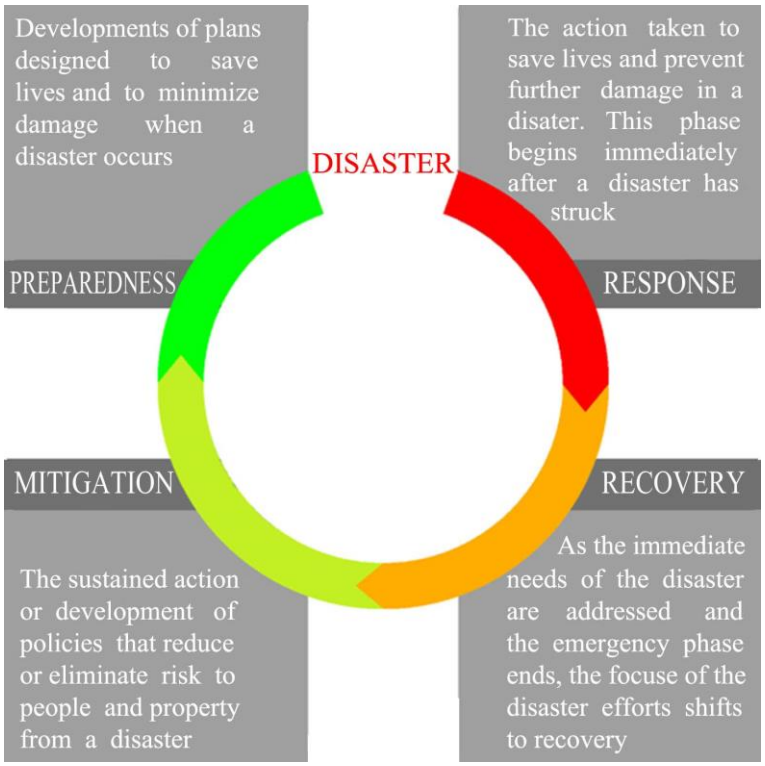

Figure 1. Stages of disasters and emergencies (adopted from the resource)[25]

It is important to note that, the activities, that, take place within the disaster cycle, are interrelated, and may happen concurrently.[25] In the same manner, World Health Organization indicates that; "although prevention/mitigation and planning/preparedness are presented separately, in practice they have many activities in common and should be regarded as interdependent and often overlapping aspects of the overall goal of vulnerability reduction".[26]

In this research, hazard mitigation, which, consists of practices that are implemented before impact, and provide passive protection at the time impact occurs;[27] including appropriate land-use and coastal zone, management practices, mandatory and voluntary building codes, and other long-term loss reduction efforts,[24] are studied. (In most of emergency-related literature, actions, such as design, planning and building codes, are known as "Passive" or "Non Structural" mitigations in contrast with "Project" or "Structural" mitigation including measures to avoid or reduce damage resulting from hazards[24])

Severity and scale of critical events

International Federation Of Red Cross and Red Crescent Societies, considers a critical event as a disaster, if:

- Ten or more people reported killed
- One hundred people or more reported affected
- Declaration of a state of emergency
- Call for international assistance[28]

This classification was first step in the development of a standardized international classification of disasters;[28] and, depending on the subject of emergency-related studies, researchers may use a specific or multiple impacts of disasters on communities. So, in order to understand the severity of a natural disaster, the impact of disasters on people, facilities and the economy, should be studied in detail. The factors, such as the number of fatalities, injuries, homelessness, affected population, affected area, and

cost of damage, can be considered for a multi-dimensional scale, which, may provide a technique to compare and contrast the impacts of different types of disasters.[15]

A disaster event may be classified as a different type of disaster by different databases.[29] As an instance, World Vision, has created a set of criteria to guide decisions regarding the magnitude (size) of emergency in the 2011 Standards For Disaster Management. In this standard, emergencies classified to four categories according to the number of affected population, injuries and mortality following a disaster[30] (figure 2).

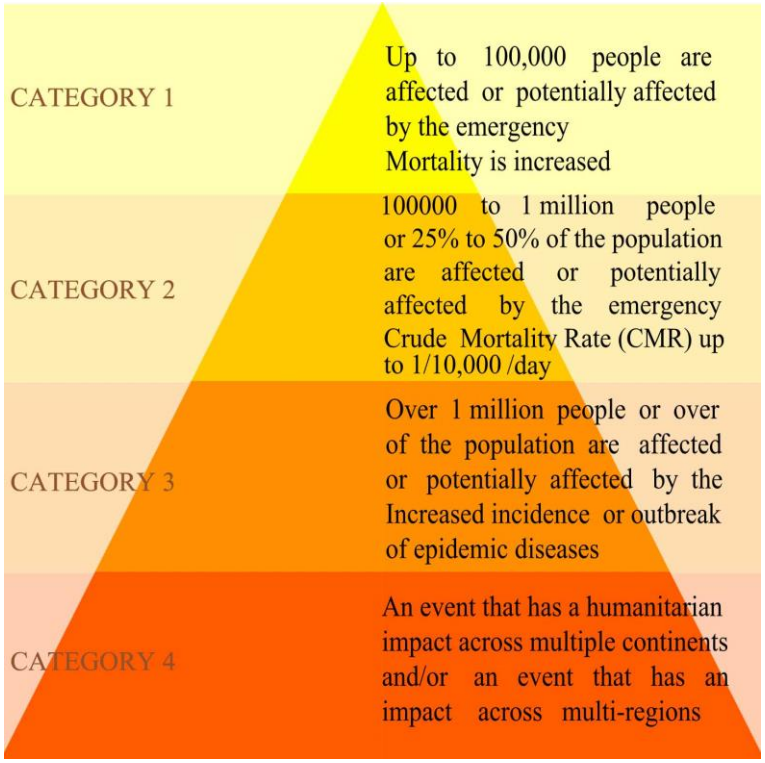

Figure 2. Severity and scale of disasters and emergencies (adopted from the resource)[30]

Regardless of the cause, most disasters have common characteristics, that, are important for disaster preparedness and planning;[31] although, no two disasters are exactly the same.[32] It is also essential to notice that, the same disaster event can have very different impacts in each country and thus, the interpretation of scale for the same event can be different from one country to the other.[33] In fact, not all countries or communities are the same, and a small impact in one, could be catastrophic to another; so, the measurement system needs to accommodate these differences.[34]

So as to consider the limiting factors, which, affect capability and capacity of hospitals in case of external emergencies, it is more helpful to study the impact of various types of disasters and emergencies, with different
scale, on rate of fatalities and injuries.

Architectural anatomy of hospitals

A hospital is a complex organization, in which, routine procedures play a dominant role.[35] In fact, hospitals are living organisms that consist of various parts with different functions, which, all of them should have a complete interrelation with each other and entire of organism, in order to provide a desirable outcome.[36]

Within the anatomy of this organism, the number and location of examining and procedure rooms, inventory rooms, administrative offices, nursing stations, staff relaxation rooms, patient waiting areas, conference rooms, and lavatories, as well as the pharmacy, kitchens, laundry room, cafeteria, and gift shop should be considered for their functional allocation.[37]
Medical and non-medical spaces, functions and services within the anatomy of hospitals, which, are common in most of hospitals, are shown in Figure 3 and Figure 4.

Figure 3. Medical services and spaces within hospitals' anatomy (adopted from the resource)[38]

Figure 4. Non-Medical services and spaces within hospitals' anatomy (adopted from the resource) [38]

In a hospital's complex anatomy, each procedure and treatment, as well as each non-medical service for the comfort and convenience of patients and visitors, has to be analyzed for its logistical and space needs, taking into account the relationships among the various departments, and the pattern of physical

movements of people, equipment and supplies.[37] Additionally, in order to provide desirable functional and operational efficiency, key facets of hospital planning[32] should be considered including; the smooth flow of patients and the avoidance of bottlenecks,[32] the analysis of specific risks and safety concerns,[39] equipment allocation,[43] future expansions,[37] and infection control.[38]

Within the parts of hospital's anatomy, their inter-relationship, determines the extent hospital operations, which, are affected when normal movement and communication of people, materials and waste are disrupted.[40] So, in architectural planning and design of a safe hospital, functional indicators, site and accessibility, and internal circulation and interoperability should be taken in account, and proper zoning of service areas should be considered for the continuous operation of hospitals.[4] Additionally, from the aspect of resilience and safety in case of emergencies, special attention must be given to ensure the physical and functional integrity of hospitals and health facilities; which, this is about more than just protecting buildings,[41] and goes beyond protection of their physical structure.[42] For these reasons, hospitals are always planned with the assistance of specialized consultants,[43] because of their complex and potentially problematic space planning.[43]

In this paper, so as to understand the needs, related to physical space in entire anatomy of a hospital, functions and complex conditions of hospsitals in case of external emergencies are studied.

Hospitals' condition, in case of external emergency

The health sector is filled with highly trained, committed and dedicated personnel, who, are ready to deliver healthcare, especially in times of great suffering and need.[10]

Critical situation occurs, when, the hospital receives an unusually large amount of new patients in a relatively short period of time, a rush that, overwhelms the capacity to meet needs, if exceptional measures are not implemented.[6] A critical situation is hereby defined as any situation, where, a hospital receives such a rush of new patients that strains the resources of the service to the limit.[6] When a mass casualty incident occurs, a high number of patients require medical assistance at once;[6] and, if the number of patients exceeds capacity, which, is different for each individual hospital, chaos can result unless the hospital can quickly switch to a disaster procedure.[35] A hospital's decision to switch from routine to disaster mode has enormous implications, and when to make that decision, and what actions to take, as a result, are complex.[45] In some cases, local facilities are not aware of the event, until or just before patients start arriving, and hospitals may receive no advance notice of the extent of the event or the numbers and types of patients they can expect.[45]

Depending on the type of event, victims, who, are less injured and mobile (the so-called "walking wounded") will often self-transport to the nearest hospitals, quickly overwhelming those facilities.[45] Initial patients can be expected within minutes, and peak volumes can be expected at two to three hours after the event.[31] Even, in acute events, emergency department volumes tend to remain elevated for days to weeks after events.[31] In this situation, enormous pressures are placed on the hospital to manage large number of causalities effectively;[32] meaning while, the hospital has its pre-disaster patients,[40] which, their treatment have to continue.

When a disaster strikes, within the people, who, injured in the event, and within population of the disaster region, there are people with critical conditions and specific demands that suppose to be accommodated in hospitals properly and immediately because of their specific and critical health condition (Table 3).

Table 3. Groups with specific and critical health condition[6,8,14,31]

Group	Condition and Justification
People with limited self-sufficiency	Unaccompanied children, elderly and disabled people
Pregnant women	Injuries to the placenta are more common
Depressed people	Agitated patients, visitors, staff, relatives, carers or friends who are stressed and anxious;
Patients with chronic diseases	Cardiovascular, respiratory, paediatric, traumatic, (chronic health conditions) And other illnesses and injuries

Unfortunately, disasters can result in a large number of fatalities;[31] consequently, within the hospital, received dead bodies should be shifted to the mortuary (hospital`s morgue department) after identification and other medico legal procedures;[46] while the treatment procedures of patients is going on.

Furthermore, in case of an external emergency, large number of people come to hospitals, other than disaster patients such as; patients' families and friends,[31] volontiers,[31] media group[6] as well as non-injured victims, who, may be without power, shelter, communication, food and water.[27] In this overcrowded condition, providing a safe environment for patients and staff,[32] protection of patients from the environment,[31] and crowd control[3] should be taken in account.

In some cases, healthcare facilities may be damaged directly during the impact, and be unable to provide emergency services, or they may need to be evacuated;[32] so, in these conditions, those healthcare facilities, that, remain operational, soon become inundated with more arriving patients than they have the staff or space to manage[32] (almost 50% of health facilities were destroyed during the recent disasters[44]).

Depending on factors and aspects, such as; which event triggers the critical situation, and/or where it happens, an emergency may present completely different characteristics and difficulties.[21] From the medical aspect, each type of threat, presents different challenges to hospitals,[45] and patient care in disasters requires alteration of scale and sometimes location of clinical care;[31] therefore, hospitals must be prepared to receive patients suffering from any type of illness, injury, or exposure (Table 4).[45]

Table 4. Examples of 3 different mass casualties and their treatment procedures[31]

Event	Treatment requirements and procedure
Earthquake	Earthquakes may cause severe traumatic injuries requiring a concentration on surge capacity of the critically ill patient. Rescue operations may last several days and unique needs, such as dialysis for renal failure for multiple crush injury victims, may need to be considered.
Chemical Release	Chemical releases may require mass decontamination as well as large numbers of ventilators, oxygen, and specific antidotes that are not typically available in large quantities.
Bomb and Blast	Depending on the nature and location of the blast, various clinical decisions will be made. Visualization of a metallic object on a single-plane radiograph is often inadequate for thorough evaluation, but it can direct the treatment team on the need for urgent

	surgery or for additional imaging. Plain chest radiographs, ultrasonography, and diagnostic peritoneal lavage are the most rapid studies used to evaluate for life-threatening injuries. Laboratory tests will be ordered sparingly.

In any casualty-producing disaster, the emergency department plays a pivotal role.[27] In addition to the load on the emergency department resources in mass-causality incidents, other departments, such as operating theaters or intensive care units may experience a demand for their services.[27]

On the other hand, hospital operations depend on a steady supply of medical and other types of material, as well as public services or lifelines;[40] thus, there are a wide variety of services that must remain functional.[40] For instance, many hospitals have currently eliminated, or greatly reduced onsite storage for linen, supplies, food and other materials essential to normal operations,[40] so, supply deliveries to the facility should continue.[32] In the same manner, gas system, hot water system and communication systems should be controlled and arranged to work in maximum capacity;[46] but, in an adverse condition, often municipal utility services will be cut off during a disaster, and alternative power, water and waste disposal services need to be provided onsite whenever possible.[40]

In case of emergencies, various factors limit hospital functions, and it is important to notice that, the limiting factor in the ability to respond to a disaster will vary by hospital and by type of disaster;[45] however, the physical space is a common and vital limiting factor in case of external emergencies in hospitals.

The issue of capacity is an immediate problem, because, many hospitals and their emergency departments are already maximizing their existing capacity after years of capacity shedding designed to reduce costs.[45] In these critical conditions, the ongoing urgent treatments and accommodations require expansion of hospitals' medical services and spaces,[4] such as surge capacity,[13] operating rooms,[31] laboratories,[13] treatment spaces,[32] intensive care units,[32] inpatient and bed capacity,[3,4] number of negative pressure rooms and morgue; and, in non medical spaces, such as waiting areas[3] and stores[47] as well.

So, within their anatomy, certain areas of the hospital must be designated for specific functions, including decontamination, triage, care of major and minor casualties, pre-surgical holding and surgical triage, psychiatric care, and morgue facilities.[31]

Accordingly, the hospital emergency plan should incorporate the details of operational areas (patient care areas) including the existing patient care areas such as; reception and triage areas, emergency and resuscitation areas, definitive care areas, intensive care areas, etc.[47] In order to manage this dynamic condition, the emergency plan should also label certain areas, which are free in the hospital area, and can be optionally used as patient care areas during the initial surge of patients;[47] and, for the purpose of planning for flexible spaces, pre-defining and devoting spaces should be done according to new extraordinary needs.[6]

It is crucial to notice that, reallocating spaces, highly depends on the characteristics of the hospital and on the creative solutions, that, may be put in place (tents, neighboring facilities and buildings, etc.).[6] In this process, safety of patients, staff and visitors as the main safety consideration, and protecting all of them from environmental condition, should be a vital consideration.

So, what to do if hospitals and emergency departments are over capacity and cannot take more patients? [48]

Some of common practical solutions, which, various emergency management and emergency medicine guidelines recommend for eliminating limiting factors related to physical spaces in hospitals during external emergencies, including solutions for expansion and relocation of medical functions within a hospital anatomy, are illustrated in Figure 5.

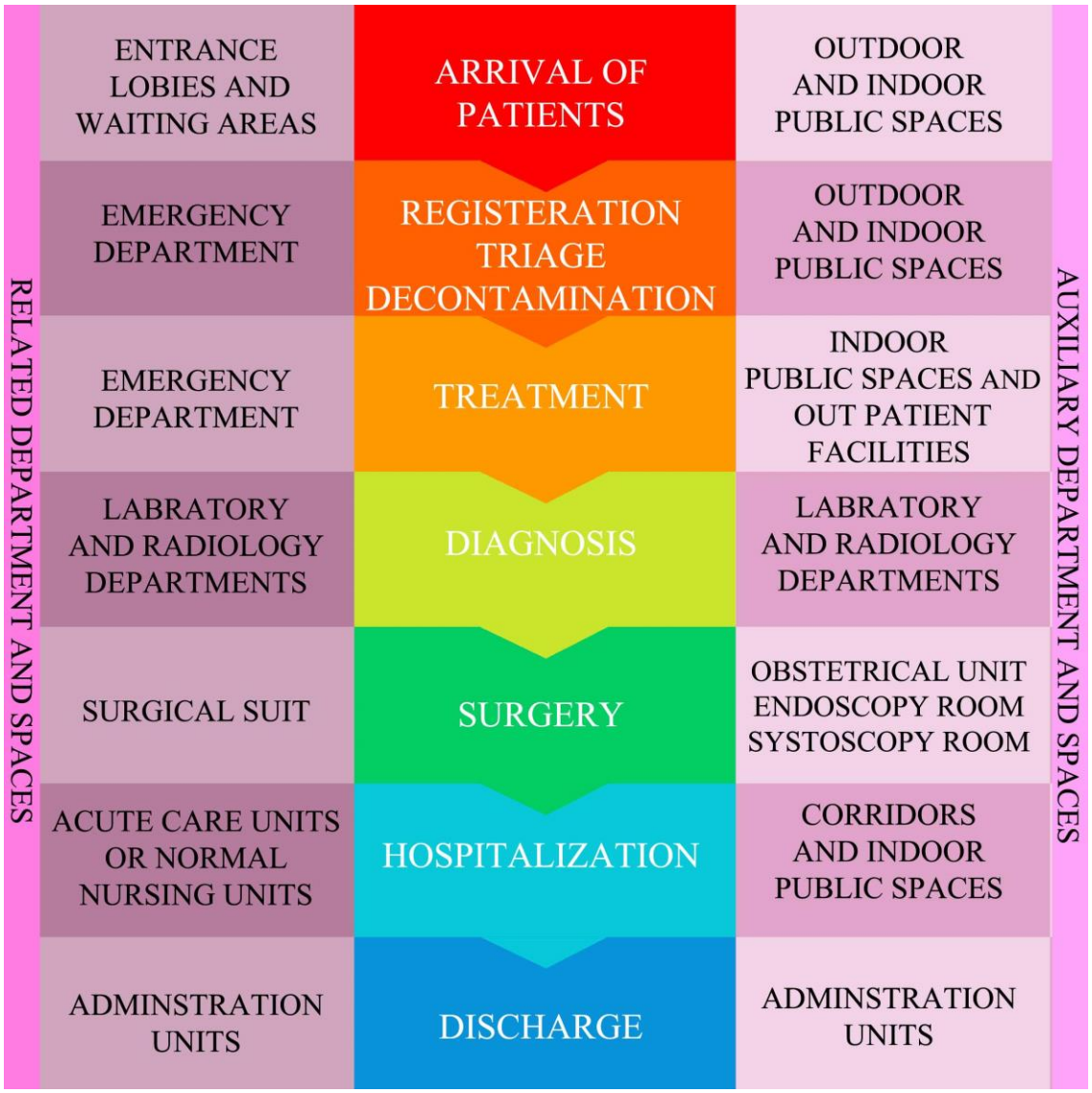

Figure 5. location of treatment procedures in case of external emergencies, in spaces within hospitals' anatomy

Earthquake of Kermanshah Province (IRAN) on November 12, 2017

Mitigation measures are often informed by lessons learned from prior incidents.[49] Valuable information gathered during the hours, days, months, and years following a disaster, can lead to policies and practices that reduce the risk of loss of life, property and natural resources. This information can be used to enhance the effectiveness of hazard and risk assessments, awareness and education, preparedness, prediction and warning, and mitigation.[50]

In this paper, critical conditions of disaster sufferers and the situation of hospitals, aftermath of the events, has been reviewed; and, one of the latest large-scale earthquakes` condition, is summarized as following;

A powerful, seven point three magnitude earthquake, hit western Iran's Kermanshah province on November 12, 2017 (Sunday), at 9:48 pm local time.[51] This catastrophic event affected ten towns, and

more than nine hundred villages; in which, totally seventy-seven thousand houses have destroyed.[52] Officials reported, more than nine thousand people injured, and more than six hundred died in this event.[53] The highest casualties (more than five hundred dead[53]) occurred in the town of Sarpol-e Zahab[51]; which, is a town, thirty-five km far from the earthquake's epicenter, with more than forty-five thousand population.[54]

Due to the great magnitude of the earthquake, the death toll and casualties grew minute by minute, and some twelve thousand buildings were razed to the ground, and left many homeless, who, were in need of tents and blankets.[55] In this natural disaster, the cut-off of electricity, gas and water has added insult to the injury, which, was fixed to a great extent by Monday night.[55]

Additionally, as a probable event in earthquakes, the only hospital of Sarpol-e Zahab; which, was a general hospital, collapsed completely in this earthquake;[54] and patients of this hospital were evacuated and distributed to the nearby cities' hospitals (Hospitals of Kermanshah city –around one hundred km from earthquake's epicenter- received most majority of injuries). This hospital collapse is an instance of an internal emergency situation and associated or secondary disaster; which, arose from the main disaster`s impact.

In order to have a clear sight from the load of casualties in triggered hospitals during early time of this disaster, statistics of the casualties are illustrated in two charts. Chart one shows the number of fatalities in first twenty-four hours of this event, and chart two shows the number of injuries which have sent to several hospitals of the region and nearby cities in first twenty-four hours of the event.

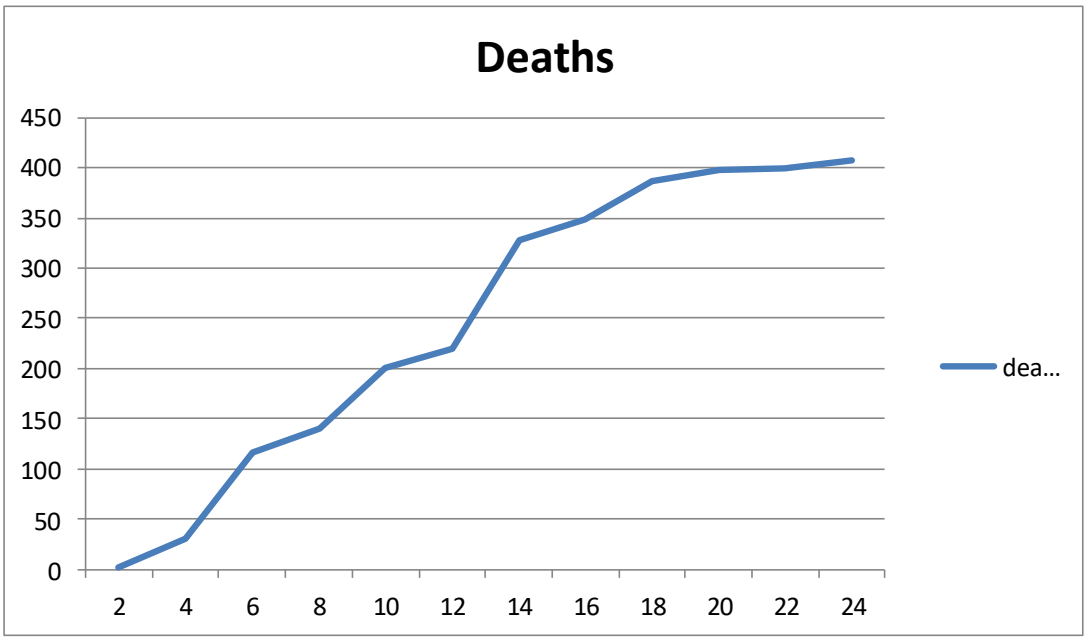

Figure 6. Number of dead people in first twenty-four hours after the earthquake

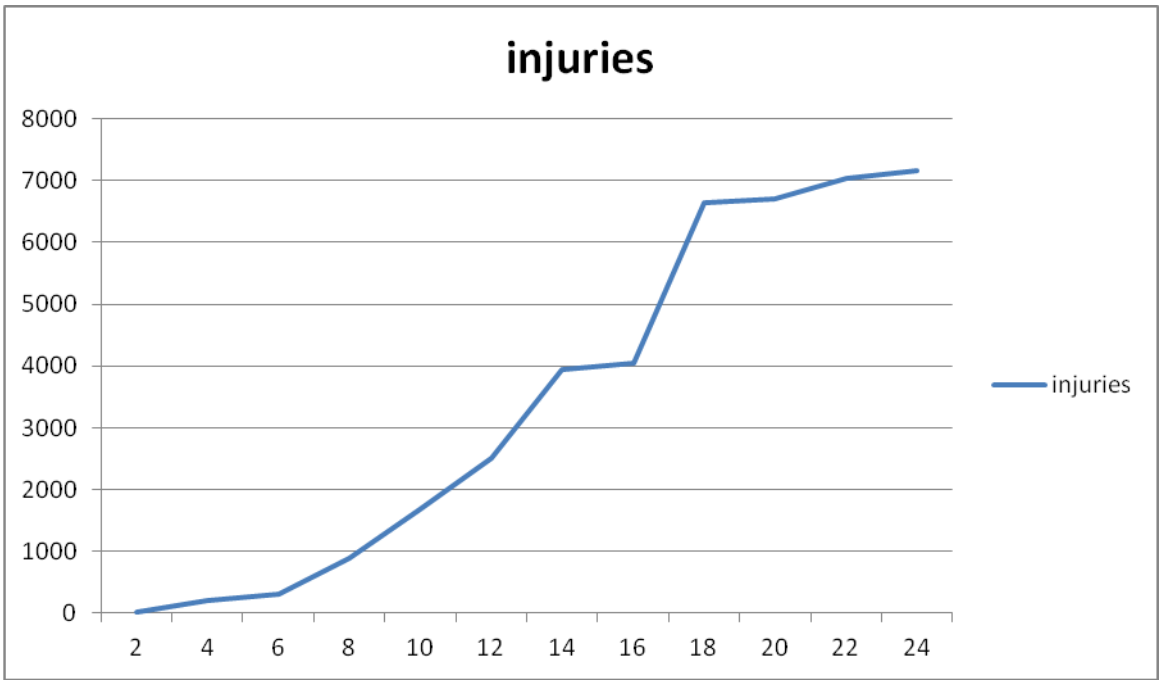

Figure 7. Number of injured people in first twenty-four hours after the earthquake

Figure 8. A mother is taking care of her baby who was born just one day after a massive earthquake struck the city of Sarpol-e Zahab in the western province of Kermanshah. The girl, named Ava, was born in a field hospital established in the city by the Army.[56]

This review shows that, critical conditions of this catastrophic event, were similar to the conditions that are indicated in most of emergency-related guidelines and disaster reports. However, this event had its own characteristics that are challenging, and should be studied in detail to learn new and unique lessons from it in order to use them in the future; specifically, in planning and design of the collapsed hospital of the town Sarpol-e Zahab, and adjusting improved emergency management plans with architectural anatomy of existing hospitals in this region.

CONCLUSION

Hospitals can be designed to mitigate these risks;[57] however, variety of functions in hospital spaces, shortness of time during an emergency, and dynamics of emergency phases makes providing indispensable adequate hospital spaces more acute and critical. In order to plan and design a safe hospital, many actions should be taken in advance, as passive mitigation. According to this study, these actions and the stages, in which, they should be taken, are as following:

"Database"-Common and simple language:

"Well-defined problems, lead to breakthrough solutions"[58]

In a new hospital project, architectural planning and design team, makes decisions about the architectural solutions for external emergencies, according to regional, national and international regulations.

Supporting these decisions; in order to make them more productive and flexible, not only needs information about the potential disasters and emergencies in the region, but also requires specific and detailed information about vulnerability of the community and medical capability and capacity of local hospitals.

For instance, from the aspect of hospitalization rate, and from the medical point of view, the usual distribution of injuries sustained, is given as; serious 10%, moderate 30% (both groups requiring hospitalization) and light 50% (10% dead). In this issue, the crucial group of disaster sufferers; the dead and slightly injured, who, do not require inpatient treatment, are in this respect, less important.[35]

This example of patient distribution; which, can vary by different events and various communities; provides a fundamental information for architects in predicting the amount of ancillary physical space in hospital`s anatomy in case of external emergencies, during the planning and design phase.[35]

These kinds of information, will drawn through multi-sectoral and comprehensive studies about potential emergencies and disaster histories of the project's location, vulnerability of the community, and the treatment procedures and medical requirements of these emergencies, that, all of them need involvement of various experienced experts, and are time consuming tasks.

In a specific hospital project, developing these studies and providing these kind of information, are likely to be difficult for an architectural team, because of the limited time for the project's design, the difficulty of uniting desired experts from other sectors in a team, and the difficulty of collecting required database in a certain region.

For this reason, officials of each region, should develop these kind of studies by creating professional teams; and make obtained results and interpretations available for hospital architects. These results, should define problems, vulnerabilities and probable limiting factors that may rise in case of external emergencies in hospitals; and should be prepared as a database with a common and simple language for various experts including; architects, emergency managers, safety experts, emergency physicians and emergency nurses.

"Design approaches and guidelines"-Planning for emergency in advance:

"Mitigation as actions that are taken well in advance"[24]

Considering disasters in hospitals is an essential subject in most of architectural design guidelines; although, in some cases, there may be contrasts between mandatory architectural design principles, and architectural solutions for emergency situations.

As an example, in case of external emergencies, for serving fluent and in time triage, stabilization and treatment service for patients, lots of free physical space should be prepared immediately in emergency department and adjacent areas as much as possible.

It is while, according to one recent approach, single room treatment concept is recommended in emergency departments, that, provides a large number of private treatment rooms, in which, each patient and their family are usually taken directly to one room for all of their treatment. In this approach, triage steps are minimized, and much of the admission process can be done directly in the room.[59]

This design approach with single rooms, is more productive for a hospital`s emergency department in day-to-day situation; in contrast, it can be challenging in case of external emergency and mass incidents.

Conclusively, planning for external emergency situation, should be considered in advance, even, during development of new architectural design approaches and design guidelines for hospitals.

"Architectural design"-Various techniques:

"Breaking down a large problem into smaller and more manageable parts is of great value"[43]

In case of external emergencies, each part of hospital anatomy, requires specific method of flexibility, according to its characteristics such as; location, adjacent space, function and existing equipments and utility.

In architectural design phase of a hospital project, in order to provide flexibility for entire hospital anatomy in case of external emergency, investigating each individual part of hospital anatomy separately, will be more productive as a design technique. In this technique, each space should be considered from the aspect of; extra work load, new interrelation with other areas, extra space requirements, capability of converting to new function, utilities, and its capacity of devoting physical space to adjacent parts (specially in case of converting non-medical spaces to medical spaces).

Depending on the space characteristics, various methods of flexibility may be considered such as; designing flexible architectural plans, using flexible materials, or providing adoptable equipment furnishing plans. Also using technological innovations such as smart spaces can be one of the methods to create easy-to-be-controlled and flexible spaces, in order to create a safe and flexible hospital anatomy.

Future studies:

Additional studies and researches can be developed in the future, for making hospitals safe in case of external emergencies. Developing design approaches for small and compacted hospitals can be one of the subjects for future studies; in the same way, physical flexibility of hospital spaces, and smart spaces in hospital anatomy are another issue for further researches.

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THE SOCIAL CONSTRUCTION OF A SENSE OF COMMUNITY: THE CASE OF THREE NEIGHBOURHOODS IN BARCELONA

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1. INTRODUCTION

A sense of community is one of the factors that lie behind healthy, sustainable and resilient neighbourhoods. The correlation between health and the sense of belonging to a community has been shown in a number of studies which confirm that "people who feel attached to and interact with others enjoy better health than do those who are more isolated" (Ross 2002, 33). Community health programmes, such as the one developed by the NHS in England, acknowledge that "Communities create the right conditions for improvements in physical health, mental health and general wellbeing by being connected, sustainable and resilient to changing times and climates"[1]. Such a comprehensive view of the community overcomes the distinctions between the physical and social, and individual and collective realms.

A will to reinforce the sense of community is also present in the neighbourhood regeneration programme ("Pla de Barris") which is currently being implemented by the municipality of Barcelona with the purpose of overcoming inequalities between the city's districts[2]. The measures included in this programme encompass various realms (education, culture, health, economy and ecology) which become intertwined through specific projects. The development and implementation of these projects offer an opportunity for the active engagement of citizens in the creation of healthy and sustainable neighbourhoods.

In the PROHABIT research project, we have studied how a sense of community has emerged in three neighbourhoods located in the periphery of the city of Barcelona which have been threatened with demolition or radical transformations over recent decades. The long fight against local government plans has revealed the capacity of the residents to identify the values of the places they live in, and to propose a shared view of what they consider to be the place identity to be preserved.

2. COMMUNITY AND SENSE OF COMMUNITY

One of the difficulties when identifying the existence of a "sense of community" starts with the definition of the term "community". This term has been subjected to historical change, and it has been defined in multiple ways from the various disciplinary perspectives of the social sciences, such as sociology, anthropology, and psychology. In their study on participation and community health, MacQueen et al. (2001) adopted a common definition of community which suits to the purpose of our research: "a group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings."

Underlying the concept of community, there is the ideal image of a group of people living in a village or neighbourhood who enjoy close relationships and can offer each other both emotional and practical support. However, the meaning of community in our contemporary cities might acquire other

connotations, such as a social and temporary construction with specific aims operating within a given setting, not necessarily physical. Such communities are not homogeneous, as they were in the idealized past, but consist of a diversity of groups and individuals, all of whom need to create a frame –i.e. the community– which embraces and represents them all.

According to Gusfield (1978), a community can be territorial, that is, constituted by those bound to a particular place, or relational, as in an association which brings together people with some common interest, without being confined to a particular location. Both kinds of community can exist separately or simultaneously, as in the idealized village. Communities have a temporal existence; they emerge and then disappear, as the bonds that keep people together dissolve or the aims that keep them together are fulfilled. In contemporary societies, people can belong to multiple communities and feel equally loyal to them.

"Sense of community" (also referred to as "psychological sense of community") is a term originally defined by Sarason (1974, 1) as "the sense that one was part of a readily available, mutually supportive network of relationships upon which one could depend and as a result of which one did not experience sustained feelings of loneliness". As Sarason argued, it is a concept loaded with values, a shared feeling rather than a measurable indicator of the qualities of a community. McMillan and Chavis (1986) attempted to disambiguate the multiple meanings associated to the term. With this purpose, they proposed to assess sense of community according to four elements: *membership*, "the feeling of belonging or of sharing a sense of personal relatedness"; *influence*, "a sense of mattering, of making a difference to a group and of the group mattering its members"; *integration and fulfilment of needs*, "the feeling that members' needs will be met by the resources received through their membership in the group"; and *shared emotional connection*, that is, "the commitment and belief that members have shared and will share history, common places, time together, and similar experiences." (McMillan and Chavis 1986, 9-13). However, as Bess et al. (2002, 6) recall, the sense of community evolves over time and, therefore, it should be considered "as a process in which the members interact, draw identity, social support, and make their own contributions to the common good".

3. PROHABIT: A RESEARCH ABOUT THE ROLE OF COMMUNITIES IN URBAN TRANSFORMATION PROCESSES

In the PROHABIT[3] project we have undertaken an interdisciplinary research –encompassing architecture, urban planning and environmental psychology– to understand the bonds between people and spaces, and between social and physical structures, in three neighbourhoods of Barcelona where citizens have played an active role in defending what they considered to be the identity of their place: Vallcarca, Trinitat Nova and Plus Ultra (Figure 1).

Figure 1. Locations of the three neighbourhoods in the city of Barcelona

3.1 Vallcarca

During the late nineteenth century and the early twentieth century, the neighbourhood of Vallcarca began to emerge on the outskirts of the old town of Gràcia, now one of the districts of the city of Barcelona. The lowest part of the neighbourhood grew along the edges of a water stream, with hills on both sides which makes it one of the highest areas in the city. Originally, it was a settlement of summer houses –intermingled with humble self-build houses– which quickly formed a small town with orchards and gardens, built without following any urban plan (Figure 2). The Metropolitan Plan of 1976 included an urban motorway for vehicles crossing the neighbourhood to enter or leave the city, running along the bottom of the valley. A later modification of the plan in the year 2002 changed the road for a green boulevard with two-way traffic (Figure 3). As a result, some of the traditional houses had to be demolished and plots were bought by private investors with the intention of building apartment blocks. Expropriated residents were moved to a new housing block which was built in the neighbourhood. The neighbours reacted and managed to paralyze the demolitions. Since then, the squatter movement has become very active and organized in this neighbourhood. Some empty lots have been transformed by newly arrived active residents into urban gardens, while others remain empty awaiting for a definitive urban plan. With this purpose, in 2016 the city organized a competition whose brief included some of the demands of the neighbours: integration of home life and work, workshops on the ground floors, a closer integration with the natural surroundings, and the use of renewable energy sources.[4]

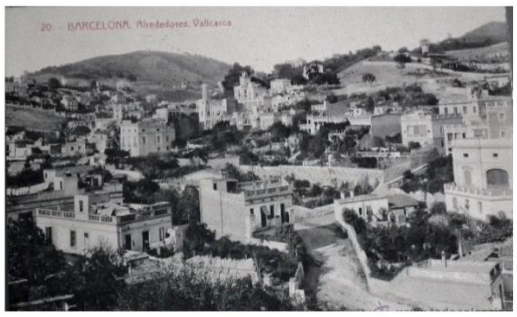

Figure 2. Early settlements in Vallcarca, beginning of the twentieth century

Figure 3. Central axis of Vallcarca neighbourhood. A modification of the General Metropolitan Plan, 2002

3.2 Plus Ultra

The Plus Ultra neighbourhood is a group of buildings located at the foothills of the Montjuïc mountain, in an agricultural zone adjacent to a water canal. Originally, it was a group of self-build two-story houses whose construction began without any urban plan in the 1920s (Figure 4).

Figure 4. View of the Plus Ultra neighbourhood, 1961, before the urbanization of the surroundings

Figure 5. Modification of the Metropolitan General Plan, 2006

During the second half of the twentieth century, the urban development in the nearby areas carried out in accordance with the Metropolitan General Plan of 1976, substantially modified the surroundings: tall housing blocks enclosed the original settlement making its integration with the city more difficult and increasing the threat of its complete disappearance (Figure 5). This plan called for the destruction of the neighbourhood, but only a part of it was demolished due to the active opposition of the neighbours. In September 2014, the city council approved a new modification of the general plan which respects the existing urban and building structure. With this updated plan, the municipality expects a slow recovery process led by the private sector that will result in the progressive improvement of the existing buildings while preserving the character of the neighbourhood.

3.3 Trinitat Nova

Trinitat Nova is an example of so-called "vertical slums" which were built during the 1950s and 60s to meet the huge demand for social housing caused by the influx of immigrants who were attracted by the industrial growth of the city. At the time of its construction, the area was located in the northern outskirts and was not linked to the public transport network (Figure 6). The blocks of flats –very small and of poorly constructed dwellings– were erected without a master plan and with total disregard to public space.

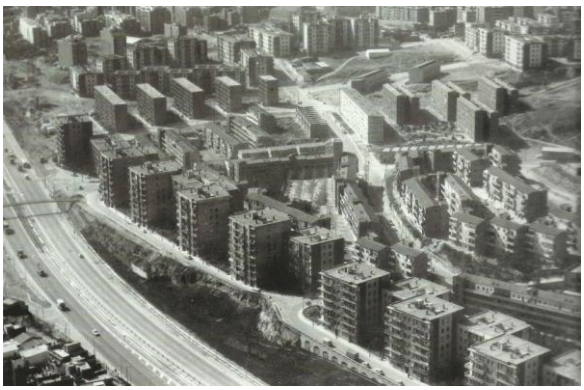

Figure 6. Trinitat Nova, during the 1960s

Figure 7. Special plan for the inner reform of Trinitat Nova, 2002

In 1991, structural damages started to appear in some of the housing blocks which had been built quickly using aluminous cement. Since much of the neighbourhood had to be demolished, in 1996, the

neighbours' association took the initiative to formulate a Community Plan which went beyond the reconstruction of the damaged housing, to include a thorough analysis of the environmental, economic and social conditions with the purpose of creating a sustainable neighbourhood, an "Ecobarrio" (Gea21 2004). In 2002, a "Special plan of the inner reform" was approved which included some of the neighbour's proposals (Figure 7). However, the original idea of the "Ecobarrio" was somehow lost. More than twenty-five years later, the newly planned homes have not yet been completed.

In the three neighbourhoods, a sense of community emerged as a reaction against the threat of disappearance. Furthermore, in all three cases the neighbours achieved their aims, and the general plans have been recently modified to meet their demands.

4. RESEARCH OBJECTIVES AND METHODOLOGY

In order to study the process of the emergence of a sense of community in each of the three case studies, we have adopted a methodology based on an iterative deductive-inductive process (Figure 8). The bottom-up approach implemented enabled us to obtain research data from non-participatory observations, interviews with key actors and residents, workshops in the neighbourhoods and documentary analysis. This collected information was subsequently analysed and some "facts" were derived and then aligned to research questions and objectives which were formulated following a top-down approach. The process of gathering and analysing information was carried out with a qualitative analysis system created specifically for this project, PROHABIT: MAPPER[5] (Figure 9). This on-line system facilitates citizens' access to the outcomes of the research, and enables them to contribute with their insights.

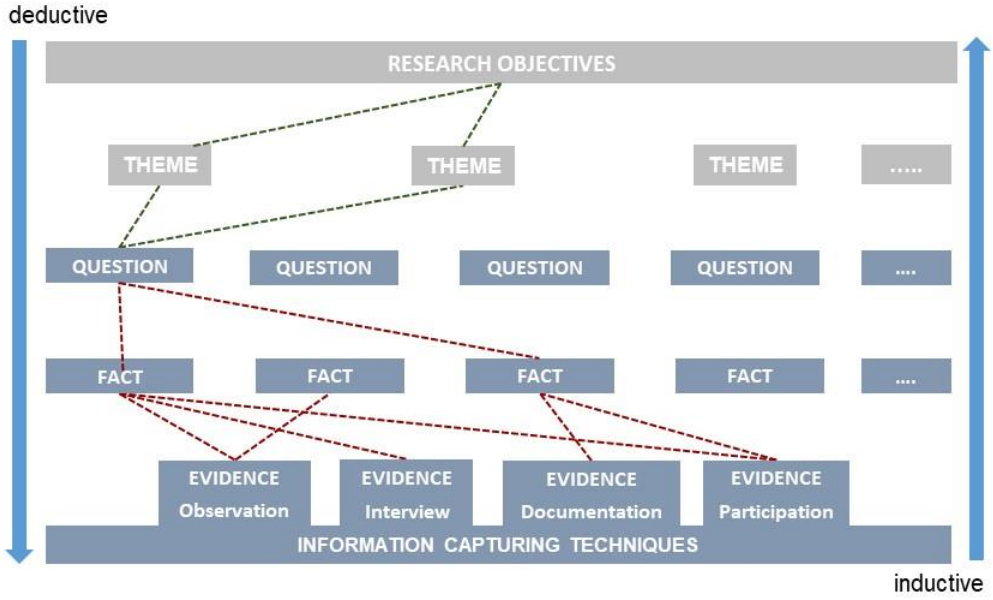

Figure 8. Structure of the research methodology

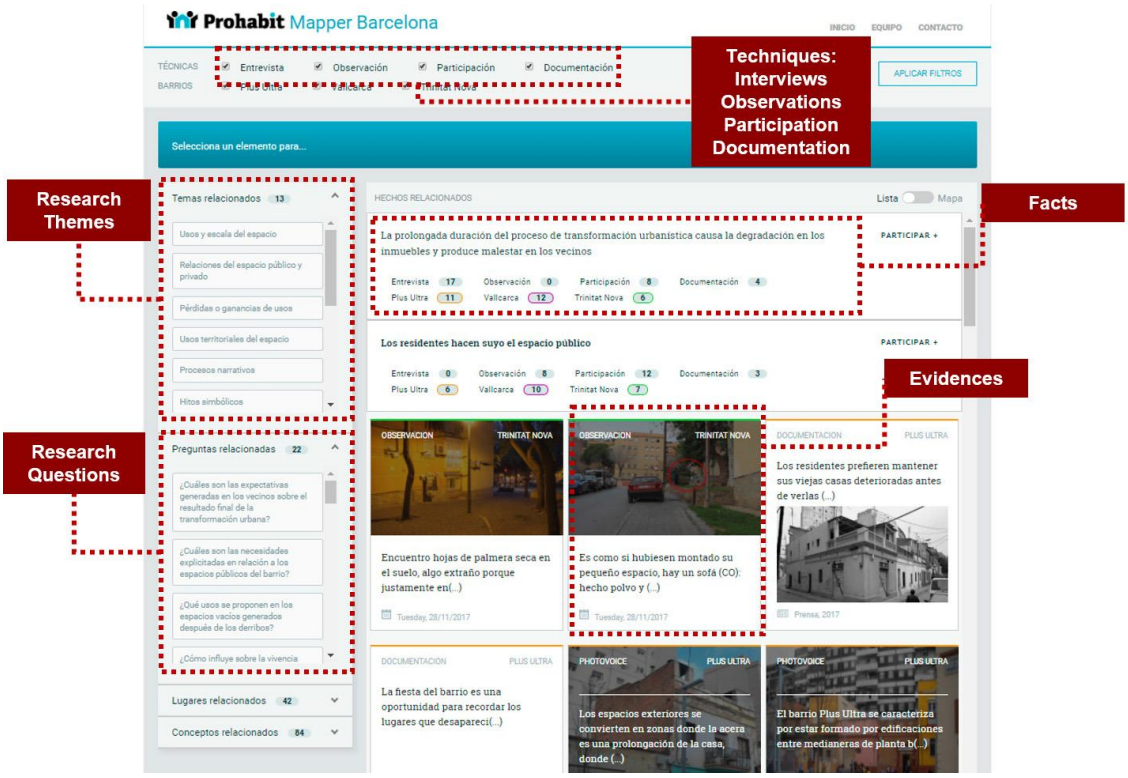

Figure 9. PROHABIT: MAPPER ©ARC Engineering and Architecture La Salle, 2015-17

Following this inductive/deductive process, which we have repeated back and forth at various iterations during the research, we have structured the findings around three topics which reflect the physical, social and symbolic dimensions of a community building process:

1. **The uses and appropriation of space**. It encompasses the study of the usages of public space, the physical and social fragmentation of the urban fabric in areas occupied by different social groups.
2. **The processes of symbolization by which the inhabitants assign meanings to spaces, both individually and collectively**. These include the analysis of the territorial uses of space, the identification of symbolic landmarks, and the analysis of the different forms of participation and levels of involvement of the neighbours.
3. **The formation of a collective identity.** It includes the identification of a sense of belonging among the neighbours, their resistance to the changes that threaten the identity of their place and the actions taken to support either the continuity or the rupture of a sense of identity

5. EVIDENCES OF SOCIALLY CONSTRUCTED COMMUNITIES

A study of the evidences analysed in the three case studies, for each of the research themes mentioned above is provided below.

5. 1 The uses and appropriation of space

The appropriation of space by the diverse social groups gives rise to spatial boundaries which might not necessarily have been planned. This appropriation of space is a manifestation of the bonds between people and spaces which result from the process of living in a place. In a social sense, appropriation makes others know that one has control over a space; in this regard, it can be equivalent to territorialisation and privacy (Proshansky 1976). In a moral and psychological sense, “appropriation” refers to taking possession of something, adapting it to one’s own needs, to expressing oneself through

the things possessed (Serfaty-Garzon 2003). Space appropriation, however, is not limited to taking physical possession of a place, but it conveys the reinterpretation of the history, meanings and values associated to it, that is to say, it is a process of interiorizing the knowledge and skills historically formed (Serfaty-Garzon 2003).

5.1.1 Vallcarca

The neighbours' demands for more green areas has led to the appropriation of some of the empty plots that have now been transformed into urban gardens (Figure 10). This appropriation conveys the recovery of the lost relationship with nature, which was originally the reason why the first settlers came; a relationship which has remained in the collective memory, as some of the historical buildings (Figure 11).

An opposite example, of non-appropriation, are the public spaces which have been recently created along the Vallcarca Avenue as a result of the demolition of buildings (Figure 12): they are seen as provisory spaces, poorly equipped with urban furniture which is aesthetically unpleasant. However, other residual spaces away from the main avenue, are more used and the graffiti on the surrounding walls is a sign of appropriation.



Figures 10, 11, 12. Public spaces in Vallcarca

5.1.2 Plus Ultra

In accordance with the latest urban regulations, the municipality has recently undergone a complete renovation of the central square and inner streets (Figure 13). However, there are complaints that these public spaces are not properly used (they are only for dogs) or not used at all (by people). Paradoxically, the renovation has increased the distancing of people and public spaces (Figure 14).

The original houses maintained a direct relationship with the street which is still preserved in some cases. This link is manifested in the occupation of the sidewalk, sometimes transformed into an extension of the private space (Figure 15). The uniformity of the renovated public space is at odds with the tendency from older residents to take possession of it.



Figures 13, 14, 15. Public spaces in Plus Ultra

5.1.3 Trinitat Nova

Even though there seem to be plenty of public spaces as a result of the successive renovations, there are not many visible signs of appropriation. In-between spaces, well-equipped with vegetation and benches,

are perceived as empty places which do not invite people to spend time there (Figure 16). There are complaints that the green areas in-between the old housing blocks smell of dog's excrements; some neighbours even perceived them as unsafe (Figure 17).
The lack of a central, representative space on the scale of the whole neighbourhood, is very much felt. The new central square is negatively criticized because the benches are not functional, or because of the lack of shade in the summertime. It is perceived as a space to pass by rather than to stay (Figure 18). The old square, which disappeared with the latest renovation, is still remembered by some neighbours as a more pleasant space, even though it became stigmatized as a place for drug dealing.
The sense of isolation with regard to the city has not completely disappeared, even though the neighbourhood is now well connected to the public transport system by bus and underground. Still, the commercial activity and cultural and social equipment do not cover the needs of residents who move to nearby areas to fulfil them.



Figures 16, 17, 18. Public spaces in Trinitat Nova

5.2 The processes of symbolization by which the inhabitants assign meanings to spaces, both individually and collectively

As McMillan and Chavis (1986, 10) have contended, "Understanding common symbol systems is prerequisite to understanding community". A symbol system is necessary for an individual to feel a member of a community. The symbolism of a space, according to Valera (1996), can be the result of the meanings associated with the physical characteristics of a spatial structure, of the function awarded by its use or of the interactions between the persons who occupy the space. In this process of attributing meaning to an environment, Pol (1997) identified the existence of two sources, one coming from an institutional power (called "a priori symbolism", for example the placement of a commemorative sculpture) that appeals to the mechanism of identification and a second one which is generated from the community itself (called "a posteriori symbolism") which is the result of transformative actions (for example, taking care of an urban garden).

5.2.1 Vallcarca

The suspension of building licenses for many years has led to the appropriation of many of the public spaces and buildings in disuse. The case of the so-called "Plaça de la Farigola" is particularly representative: an empty lot left by the demolished buildings has been transformed into the "main square" of the neighbourhood. Similarly, other empty lots have been transformed into self-managed urban gardens. The graffiti that fills many of the empty facades are also an example of the appropriation of the place by neighbours. However, while some of these appropriations of public or private spaces are seen positively by some of neighbours, others consider them to be negative.

5.2.2 Plus Ultra

In the long process in which the neighbourhood has been under the threat of disappearance, the older residents have moved away, being replaced by new neighbours, mostly immigrants, who have found the

buildings in a state of deterioration. The new residents have made the public space they have found their own (with social gatherings in the central square or in front of the houses, leaving the dogs in front of the houses, etc.) while the former neighbours feel excluded from it. The renewal of streets and urban furniture undertaken by the municipality has accelerated this process of detachment of the former residents with their neighbourhood.

5.2.3 Trinitat Nova

The participatory process led by residents during the 1990s with the objective of creating a sustainable neighbourhood was exemplary in many aspects. Former residents still remember this experience positively. However, the newcomers do not appreciate the achievements of their predecessors or simply they do not know about them. On the other hand, the slowness in the execution of the reform plans and the various modifications suffered in the construction process have led to the disenchantment of many of the neighbours who were involved in the community-led development.

Many of the public spaces initially agreed upon with neighbours – their use, form, materials and equipment – have not fulfilled the expectations and have become mere areas of circulation. The areas with greater social activity are still the old ones, which have not been affected by the last urban plan. Older neighbours still remember some demolished landmarks as representative elements of the neighbourhood, for example, the "clock tower" or the "water-carrying bridge".

5.3 The formation of a collective identity

In order to present an alternative to the renovation plans of the municipality, the neighbours have felt impelled to construct an identity of the place –an image and a narrative of what they consider to be the essential features and values to be preserved – created from personal memories and historical evidences. As defined by Proshansky (1978, 155), place identity embraces "a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals, and behavioural tendencies and skills" which relate the individual with the environment. This identity with the place is a social construction process involving both the community and the individual. As this process evolves, the identity with the place changes as a consequence of the evolution of the individual as well as the transformations of the physical and social environments.

5.3.1 Vallcarca

The groups of younger residents who have arrived in recent years, many of whom are linked to social movements that sympathize with squatters, have led the defence of the neighbourhood's identity. These newcomers have developed a strong sense of attachment to the place that has been manifested through social, ludic and protest actions. This group of new residents has appropriated –or re-appropriated– the imaginary of the previous generation, claiming the return to a way of life based on a closer relationship with nature and a stronger sense of community, in line with the current discourse on sustainable –environmentally and socially– environments.

5.3.2 Plus Ultra

In parallel to their struggle with the administration, the first generation of settlers have undertaken a process of construction of a place identity. For example, setting (or re-setting) the celebration of the stomping of the grape which evokes the agricultural origins of the area, when residents picked grapes in the nearby vineyards to produce wine.

The houses, and the memories that they evoke in the former residents, are the materialization of their life experiences. Therefore, the final decision of the city council to preserve the buildings satisfies the demands of the former residents: in a way, it is the recognition of the meaning and value of their own

lives. But the new residents are not aware of the personal stories associated to the buildings and spaces once inhabited by former neighbours. Therefore, it remains to be seen whether the newcomers will be willing to preserve the memory of the place that they have inherited from the previous generation.

5.3.3 Trinitat Nova

In Trinitat Nova, there has been a long tradition of activism, with neighbours claiming their rights to decent living conditions from the public administrations since the very moment they settled. This attitude, maintained over the years, has made the neighbourhood a symbol of the fight against powers ruling the city. The first residents, immigrants arriving in precarious situations, developed an attitude of solidarity and resistance in their fight for decent living conditions. The identification of Trinitat Nova with sustainable development, which was very strong in the period that the "Ecobarrio" was being planned and discussed, has somehow vanished over the years. Nowadays, between the two identities – a neighbourhood of fighters against power or a model for sustainable planning– the first one has prevailed.

6. CONCLUSIONS

The image of an idealized community is very much present in the memories of the oldest neighbours. In all three neighbourhoods, interviewed residents evoke a past in which they were mutually supportive with each other, sharing their lives in the public spaces. However, this "ideal community" is not so much an aim to achieve as a necessary element in the process of a social construction of today's community.

Even though neighbours have succeeded in creating a sense of community which has helped them to achieve their goals, the diversity of social groups (particularly of different ages and origins) is reflected in the territorialisation and the use of public space. An opposite trend is the creation of events and places which represent the community as a whole, as the stomping of the grape in the central square of Plus Ultra, or the local celebrations at the "Plaça de la Farigola" in Vallcarca. The lack of such a central representative space is very much felt in Trinitat Nova.

In the three cases of study, the sense of community has been reinforced because of the need to defend not only the permanence of the buildings and public spaces but also the meanings and values that the residents had attached to them. The process of community building has been in some cases more inclusive than in others. In Vallcarca, newly arrived young residents have led the reconstruction of the memory of the place and then defend its identity against the plans of the administration and the private developers. In Plus Ultra and Trinitat Nova, on the other hand, the community building process seem to have excluded those which were not part of the first generation of settlers.

The development of a city is a process over time which affects both its social and physical fabric. A strong involvement of the community at a certain moment in its history can foster social cohesion and strengthen the ties between people and the places they live in. But the materialization of an urban plan can take a long time, to the extent that when the agreed projects are executed the ties between people and places might have diluted. Furthermore, the continuous changes of residence do not help people to develop their identity with the place. In these conditions, neighbourhood resilience –encompassing its material and immaterial attributes– is fundamental to maintain the community alive, to preserve and transmit the memory of the place, while continuously updating its identity.

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ACTIVE CITIZENS: THE KEY TO A VIVID AND HEALTHY URBAN ENVIRONMENT: CASE-STUDY OF "TRAKIYA" PLATTENBAU NEIGHBOURHOOD

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Introduction

"Trakiya" is a prefabricated social housing district in Plovdiv. It is the third biggest plattenbau district in Bulgaria (60 000 inhabitants) after "Lyulin" (122 952 residents) and "Mladost" (108 972 residents), both of which are located in Sofia[1]. Currently, "Trakiya" is home to 1/6th of the population of Plovdiv and its demographic profile matches the rest of the city.

The research explores the transformation of "Trakiya" into a district preferred for raising children, and provides an in-depth look at the interrelations between the developed medical infrastructure, local socio-cultural practices of its inhabitants and the way it is creating a healthy and vivid urban environment.

The information was gathered as a part of a large-scale interdisciplinary study, conducted from February until October 2016 for One Architecture Week - an annual international festival with a focus on contemporary architecture and urban environment issues aiming to raise awareness about various urban problems, to engage researchers on a new topic and challenges of local national and international importance, to stimulate an active and responsible behaviour towards the city, to initiate actions for a positive and visible improvement of the quality of architecture and urban planning of Bulgarian cities.

Historical evolution of the "Trakiya" residential district

Even though present day "Trakiya" was planned during the 1970s, and built in the late 1970s and the early 1980s[2] its territory used to be one of the first inhabited places in Plovdiv – the prehistoric settlement (Yasatepe), consisting of burial mounds, pits and sanctuaries dated in the Neolithic period - about 6 000 BC[3]. Unlike other similar mound settlements, Yasatepe was not chosen because of natural fortification, but rather because of the fertile lands of the nearby river - offering the most favourable conditions for a peaceful life. Later, with the expansion of the Roman Empire and subsequent intensified barbaric raids, accompanied by a massive earthquake (around 7th century), due to security reasons, the population moved into the centre of Plovdiv leaving the land only as agricultural territory, for the next 13 centuries - until well after WWII.

The history of modern pre-fab district of "Trakiya" starts in 1965 when a new urban development plan for Plovdiv was proposed. The city was supposed to evolve as a compact structure for 450 000 citizens with growing suburban districts. The plan served as a basis for an architectural and urban design contest brief in 1970-1971. However, the results from the concept contest did not fully meet expectations, and planning was assigned to the competition winners - the design collective (RPO-Plovdiv with design-lead architect Ivan Popov) for a reworked proposal. The final concept for "Trakiya" was finished during 1972. In 1978 a huge design collective was formed - more than 60 urban planners, architects, engineers,

landscape architects, designers, etc. started the production of all technical drawings. Meanwhile, a new factory for pre-fab concrete panels was built and began to function nearby.

Built in accordance with the modernist urban planning principles and social engineering practices [4] "Trakiya" was supposed to house more than 70 000 people[5]. The pursuit of green, tranquil open spaces, typical of modernist theory was realized here, yet at the cost of the human scale[6]. Thus, the plans for "Trakiya" featured lots of green spaces, parks, alcoves, and recreation areas, placed in adjacency to the residential buildings or on top of underground parking lots[7],bringing nature into the dynamic urban environment and creating vibrant and fresh outdoor spaces.

On the other hand, the district served the adjacent towns and villages as well. It was situated on the south-eastern part of the city with strong communication arteries Karlovo-Plovdiv-Smolyan (from north to south) and Sofia-Plovdiv-Istanbul (from east to west). In near proximity the southern, the eastern and the south-eastern industrial zones were rapidly developing, drawing more and more workers from the neighbouring smaller towns and villages. The administrative centre of "Trakiya" was supposed to serve as a major cultural, health, security, trade and transport hub for the nearby settlement groups.

"Trakiya" soon turned into a laboratory for testing the new principles of socialist society - homogenizing society by integrating different social strata and overcoming their cultural background and ethnic differences[8], and thus fostering the ultimate transformation of modern Bulgarian society – from rural into urban. Yet, in the context of forced industrialization and the increasing urbanization during the 1950s and the 1960s, the new ideal socialist society was very similar to that of Znepolsky[9] - "neither rural, nor is it fully urbanized: 'In front of us stands the portrait of a transitional time, marked by intermediate, transitional forms: neither city, nor village, neither citizens (city dwellers), nor villagers.". The intermixture of urban and rural migrants turned out to be, as Nikolov states, "a homogenous mass of alienated, atomized, and amorphous 'proletariats', which lacked a fixed point of insertion in the social body"[10] who tried to distinguish themselves from past forms of behaviour, traditions and daily habits.

The excessive urbanization during the 1960s and 1970s had led to the urgent need of erecting new districts with pre-fab multi-storey apartment buildings in order to accommodate the constant flow of newcomers and workers. Populating the new districts was carried out under the governmental policy of maximum heterogeneity of class, culture, educational and work status, and ethnicity. The leading principle was that the differences between the rural and the urban life had to be erased by introducing a new urban routine, by uplifting the culture of life and work, the specialization of labour, etc.[11] These practises resulted in two main scenarios – the neighbour families, forming the local micro-communities, were either colleagues at work, or from completely different and contrasting backgrounds (university professors, military, roma families, etc.) [12]. All newcomers were predominantly young and middle aged families, with children, mostly working in the industrial zone nearby[13] - the perfect representatives of the new way of life. "Trakiya" was one attempt to materialize a modern utopian society by "random assimilation of groups of random people put together under the same roof, obeying the same rules"[14]. The residents were more or less isolated from the rest of the city and had to develop their own specific rules, urban and social habits of communication and life.

In 1985, just as the top-down decision that prompted work on the district, a parliamentary Commission on residential housing matters decided that the construction of large pre-fabricated housing should be drastically reduced[15]. Later, the fall of the Berlin wall brought huge transformations into Bulgarian society and the political status-quo - the construction of the remaining social, cultural, commercial, and administrative and sports facilities was halted, leaving a huge gap in services. The only functioning facilities in "Trakiya" were the schools, the kindergartens and the nurseries for the infants, as they were considered essential for the needs of the residents (selected young families with children that were supposed to build the new socialist society). In contrast to this, there were no finished sidewalks, no

sufficient social and technical infrastructure. The planned hospital with 1200 beds was never built, only a polyclinic was finished. Crime rates started rising and "Trakiya" became the most notorious district in Plovdiv. This was the public image of the neighbourhood up to 2012 when surprisingly it was announced as the best place to live in Plovdiv. This signalled that a huge transformation had been underway, making good use of the vast green spaces, excellent transport infrastructure, and supplementing them with plentiful health, social and educational infrastructure – a fine example for a pleasant and healthy urban microclimate.

Aim and Objectives

The aim of the research is to explore the transformation of "Trakiya" into a district preferred for raising children, and to provide an in-depth look at the interrelations of the developed medical infrastructure, local socio-cultural practices of its inhabitants and the way they create a healthy and vivid urban environment. The main objectives are:

- mapping the medical infrastructure of the district;
- exploring the social aspect of raising children in the neighbourhood;
- exploring the social facilities in the neighbourhood;
- exploring some of the social practices and urban rituals of the residents;
- exploring other life aspects - mobility, sports and recreation, economic microclimate, cultural practices, etc.
- identifying residents' main challenges and struggles.

Methodology

In 2016 OAW festival focused on the mechanisms of citizen participation by exploring the everyday experiences of living together in a socialist collective housing neighbourhood. "Trakiya" was a clean slate - for the last 13 centuries it had remained as agricultural land, all buildings and the local community were the result of top-down planning. In order to strengthen the neighbourhood spirit of the residents, a vast number of formal rituals were established by the administration. For instance – all the residents of one whole building were supposed to move-in at the same time with an official ceremony. Later anniversaries of that date were marked, alongside with other local rituals and celebrations. On the other hand, "Trakiya", as a suburban district, was almost isolated from the rest of the city. The poor public transport connectivity, the high cost of taxi services, and the fact that the most people lived and worked within the neighbourhood had led to a capsulated evolution of the whole area. The result was a drastic identity rift between Plovdiv and its sub-district "Trakiya, up to the stage that the residents of "Trakiya" called themselves "trakiitsi" (i.e. thracians).

The scope of the research included the whole administrative region of "Trakiya" municipality – 13 micro-regions with more than 60 000 citizens. Preliminary information was gathered between February 2016 and October 2016, but the study of the region is still ongoing. A detailed database serves as a solid foundation for further analysis and cross-reference. The initial short period for research has set a very dynamic pace of work. A special research methodology was created. The initial ordered hierarchical tree of urban systems and sub-systems led to some major difficulties as some of the urban elements were related to more than one system. Thus, in order to explore all related urban aspects, an incomplete graph of interrelated systems and urban elements was developed. This complex structure affected the methodology of the research - each and every individual sub-element had to be explored by different means and techniques. The study included desk research; online research; field surveys; interviews with local residents; a quasi-representative questionnaire among 477 "Trakiya" residents, economic analysis, and the production of map materials. The huge interdisciplinary team included more than 60 people –

high-school and university students, volunteers, specialists, university professors, etc. and even volunteers with no particular specialty, skill or education. Each and every one of them was included in the team with a particular task reflecting their abilities.
In order to trace the transformation from "planned socialist district suitable for young families and their children" through "notorious, avoided, dangerous outskirts" into one of the best places to live in and to raise children, a comparison of different aspects of urban life in the area between people with and without children is made.

Results

Demography

Currently "Trakiya" has more than 60 000 inhabitants, and the birth-rate, declining during the 1990s, is currently drastically rising. According to local authorities, the ratio between males and females is 49% to 51%. The age distribution is as follows: 17% below the age of 18, 65% in working age and 18% in retirement. The distribution among the people below the age of 18 follows the pattern: 14-17 year-old are 18%, 7-13 year-old – 37% and the children below the age of 7 – 45% of all children. On the other hand, the results of the questionnaire revealed another age structure for the people above 18 years old: 19% were between 18 and 24-year-old, 25% 25-34-year old, 22% - 35-44-year old, 15% 45-54-year-old, 12% 55-64-year-old, and finally 7% at the age of 65 and above. This age profile shows the continuing trend of predominantly young and middle aged, active people, favouring the specific self-organizing nature of the urban environment. From the interviewed 477 people, 53 % are either married, or living together, and 33% are singles, 6% - widowed, and 8% - divorced or separated.
The number of the people living together in a single household is as follows: 13% are living alone, 34% are sharing a household with another person, 30% - with two other people, 18% are living in a household of 4 people altogether, 3% - with 5 people, 1% - with 6 people, and less than 1% - with 7 people or more.
In terms of educational status, 41% of the respondents have college or higher education, 29% - secondary education, 25% — special profiled secondary education, 4% - primary and 1% - elementary. This educational profile of relatively high education leads to very good practical realization in terms of employment - 51% of the respondents have a full time job and 14% are working part-time. The share of retired people is 13%. Another 13% still are scholars, 3% are in a maternity leave, 1% are housewives and only 5% are unemployed.
Concerning the matter of parenthood, 57% of the respondents living in "Trakiya" have children and of all people with children, 85% own an apartment. This long-term engagement with the territory due to real estate ownership is a strong predisposition for a stable interrelation with the urban environment and a very pro-active personal approach in its improvement.

Living Environment

The architectural concept wanted to overcome the monotony of the typical pre-fab buildings erected at the time. Thus the planners decided to use a modular approach, to develop different types of apartments in accordance to the number of people in the household. The options were apartments for a single person, but also for 2, 3, 4, and 5 people. They were also keeping in mind different age variations. The functional modules could be rotated and attached to each other. By this they managed to achieve a few different types of modular building sections, resulting in a very distinct look of the whole building.[16]
In terms of the ownership 65% of the respondents own their own apartment, which breaks down among the different age groups in the following way: 35% from the respondents between 18 and 30 years old

own an apartment, 81% from the respondents between 31- and 60 years old own an apartment, and 94% from the respondents above 61 years old own an apartment.

The long-term commitment with the territory led to some very specific changes in the built environment and the apartment structures. Often on the facades of the buildings different types of add-ons can be observed – creating alternative entrances/exits to the apartments on the ground floor; transforming apartments into studios or shops; transforming the spaces for collecting garbage into beauty salons and shops; transforming the balconies (by putting additional window framing) into functional part of the apartment – either as an extension to a room, or as a tiny kitchen; adding metal frames and grids for security reasons; adding rooms/alcoves on top of existing structures and roofs; opening new windows and doors; utilizing the space underneath the balconies on the ground floor, etc. All these transformations can serve as indicators of the quality and the dynamic of the everyday life in Trakiya, as a proof for the never-ending adaptation and optimization in accordance to the changing mundane life, as a consequence of the eternal struggle to utilize every square millimetre possible.

These adaptations indicate whether the initial architectural and urban project truly reflected and responded to the needs of the inhabitants. On one hand, they are a bright flicker of individuality in the common setting of equality and monotony - they speak about the residents' personal story, preferences and unique life-style. These micro-interventions play a major role in the contemporary residential districts, as they are the primary result of the subconscious need for optimization, of the individual approach towards everyday challenges and struggles.

Mobility and Shopping Habits

In the beginning of 1990s, the transition from planned towards market-based economy had cost a lot of people their jobs, leading to decreased shopping opportunities and almost zero urban mobility. A local response to the crisis was started the emergence of barely legal corner shops, or offices situated in adapted apartments on the ground floors of residential buildings, with separate entrances straight from the street[17] (Fig.1). Looking at current shopping habits and the overall mobility of the people in "Trakiya", the use of these shops has persisted after the crisis, the results show that the people with children are less active and do not feel the need to go shopping outside the district. During meetings with local mothers, most of them stated that they do not feel the need to go shopping outside "Trakiya", as they can find everything they need in the district. This encapsulation phenomenon is a direct outcome of the development of private small shops and facilities. It boosts local economic growth, and makes the environment more convenient, while presenting more job opportunities for the residents.

Figure 1. Shops and offices on the ground floor of residential buildings. (Photo: Nina Toleva-Nowak)

Education

The educational complexes were designed in a way that respected the vast green spaces and the tectonics of the adjacent buildings resulting in innovative compact structures, in opposition to the traditional linear organization of school buildings[18]. The fact that the schools were the first and actually the only implemented public buildings from the original plan speaks about the family-orientated approach even in the phase of construction. Currently, there are 4 infant nurseries, 10 kindergartens (both municipal and private), 1 community based infant and young child feeding facility, 4 schools and 1 university (Fig. 2).

The kindergartens and the nurseries for infants are located in the centre of the micro-quarters, immersed in the lavish parks ensuring a tranquil, safe, healthy and pleasant environment. Along with that, a supplementary network of local community/cultural micro-centres (the so-called “chitalishte”) was developed, which offered piano, guitar, singing, drawing classes, foreign language lessons, arts and crafts activities, organization of local cultural events and festivals, “summer schools” while also functioning as local libraries. Currently this causes an influx of young families with children toward the district in order to benefit from the well-developed (in comparison with the rest of the city) kindergarten and nursery infrastructure.

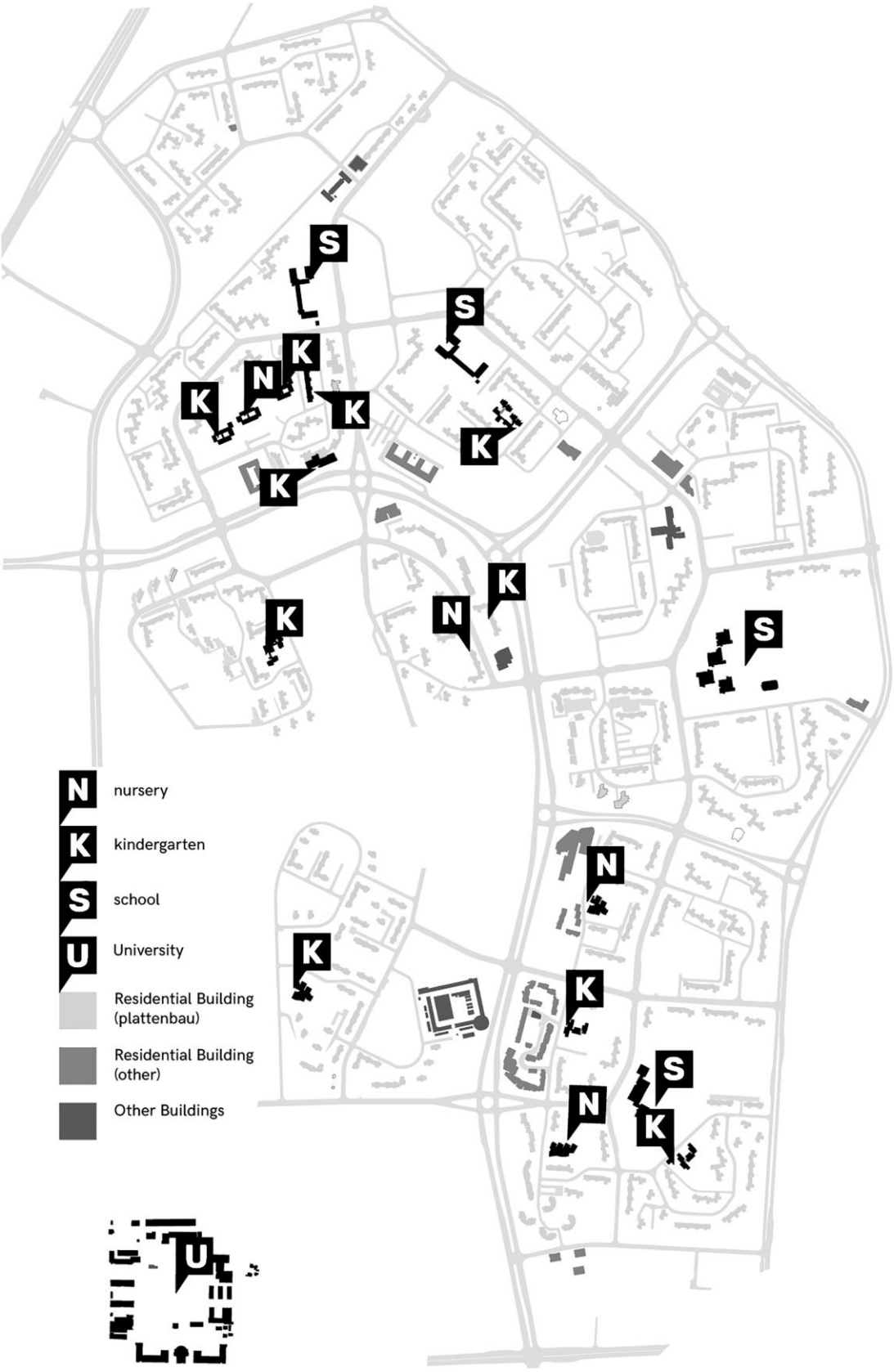

Figure 2. Schools, kindergartens, nurseries for infants. (Author: Nina Toleva-Nowak)

Green System, Recreation, Education Facilities and Spare Time

The green system was planned in order to permeate the urban matter and to deliver the needed quality of life for all age groups. The spaces between the buildings were organized as multifunctional communal areas, as an intermediate space between the huge residential blocks filled with children playgrounds, alcoves, recreational facilities, etc. Even though that concept was not fully implemented, with the passing years the space self-organized following that pre-planned pattern. Along with that a huge park named “Lauta” was planned during 1977-1978 and is currently one of the biggest green spots in the whole city of Plovdiv. It is the park, that is the main composition centre of “Trakiya” district and even though it is surrounded by multi-storey residential buildings, its green sleeves penetrate the whole region, unifying the whore territory with green spaces and vast lawns. “Lauta” park is still one of the most preferred spaces for outdoor activities and recreation not only in “Trakiya”, but in Plovdiv as well. Only 24% of the respondents doing sports have children, and their top two preferred activities are dancing and yoga – activities related more with relaxation and entertainment. In comparison, people without children prefer fitness and martial arts – activities related with heavy physical training. There are multiple sports clubs, playgrounds and public open-air street fitness facilities, used by children, adults and the elderly, as well (Fig.3).

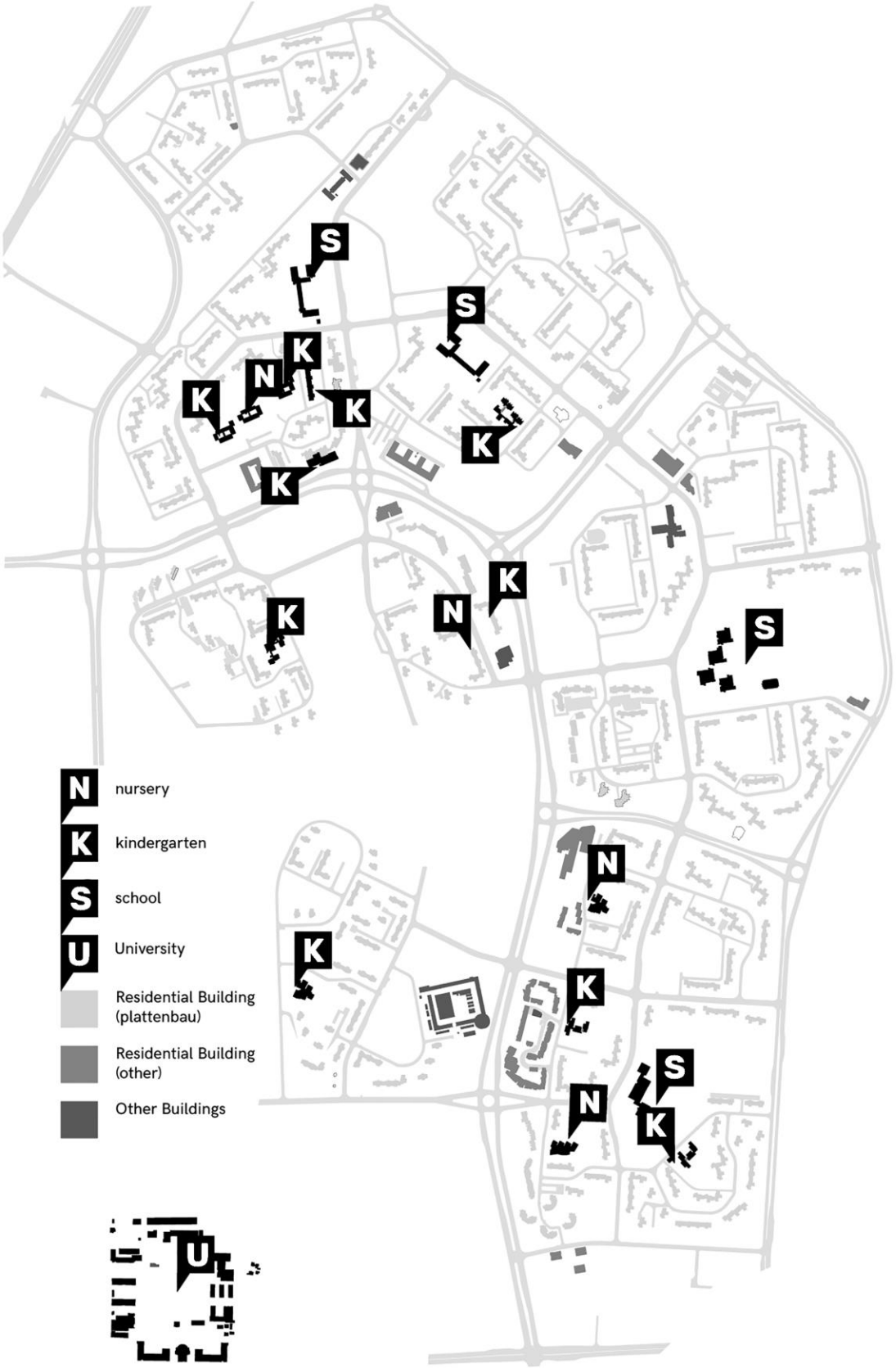

Figure 3. Playgrounds and sports facilities. (Author: Nina Toleva-Nowak)

During the field surveys specific social recreational practices started to reveal – "the exterior living room" in front of the entrance of the building. This socialization activities may be perceived as an extension of the interior space of the home, meshing with the open public space – into the exterior of the neighbourhood[19]. Some of the preferred communal outdoor activities include playing cards, backgammon, gathering for coffee and sweets in front of the building, having home cooked dinner with neighbours in the nearby alcoves, or just sharing salad and drinks, from late spring until late autumn. Most of the elderly residents enjoy also basking in the sun, practicing gardening and taking care of the adjacent greenery, or simply gathering at the children's playground for a chat. (Fig. 4).

Figure 4. Out-door "living room" and spending some time with the neighbours. Photo: Nina Toleva-Nowak)

There is a significant change in the pattern of spending free time. People with children, as expected, prefer to spend their free time during the work days at home (62%), walking in the park (18%), at a bar/restaurant (11%), attending cultural events (6%), doing sports (2%), or other (less than 1%). On the other hand the people without children prefer to spend their free time during the work days mostly at the bar/restaurants (31%), then at home (26%), doing sports (25%), walking in the park (12%), attending cultural events (5%), and other (1%). The pattern changes compared to the weekends as well as follows: people with children prefer to stay at home (29%), walks in the park(25%), travelling to the countryside (20%), go to a bar/restaurant (13%), attending cultural events (7%), doing sports (5%), other (less than 1%), while people without children go to a bar/restaurant (31%), travelling to the countryside (24%), doing sports (16%), stay at home (12%), walking in the parks (9%), attending cultural events (8%). Observing the preferred "going for a walk pattern" among the people with children, it is not surprising they consider the district to be a good place to live in, as "Trakiya" is famous for its vast green lawns, huge "Lauta" park, and several smaller parks and multiple playgrounds. In "Trakiya" there is a huge number of children and sports playgrounds suitable for every age. Some of the playground facilities are sponsored by private organizations or by legal entities or trade brands. They are often located in adjacency to the apartment buildings, yet some of them are located on top of underground parking lots,

and thus bettering the environment and bringing closer the greenery and the residential infrastructure (Fig. 3).

The poor maintenance of the green spaces is not a problem, as the residents often step up and start taking care of it themselves (Fig.5)

Figure 5. Maintenance of the adjacent territory. (Photo: Nina Toleva-Nowak)

Healthcare and Social Infrastructure

The health infrastructure planning principle was bringing the medical care closer to the residents. This included not only the different treatment procedures and units, but also those needed for prophylaxis. According to the plan for "Trakiya", there was supposed to be a hospital with 1200 beds and a polyclinic, yet only the second one was built. An optimal place for the polyclinic was chosen in order to satisfy not only the needs of "Trakiya" residents, but that of the rest of the city and the residents of near-by towns and villages as well, ensuring balanced medical infrastructure network on a larger urban scale with optimal service radiuses.[20] The market-oriented economy affected the medical practice as well - numerous private medical practices opened, as well as some private hospitals. In the beginning of 2017, there were 33 active medical offices (27, general practitioners, 6 specialized offices (ENT, urology, ophthalmology, neurology, and paediatric), 13 dental specialists, 1 private hospital, a public polyclinic, 16 pharmacies, 4 drugstores and 3 laboratories (Fig. 6).

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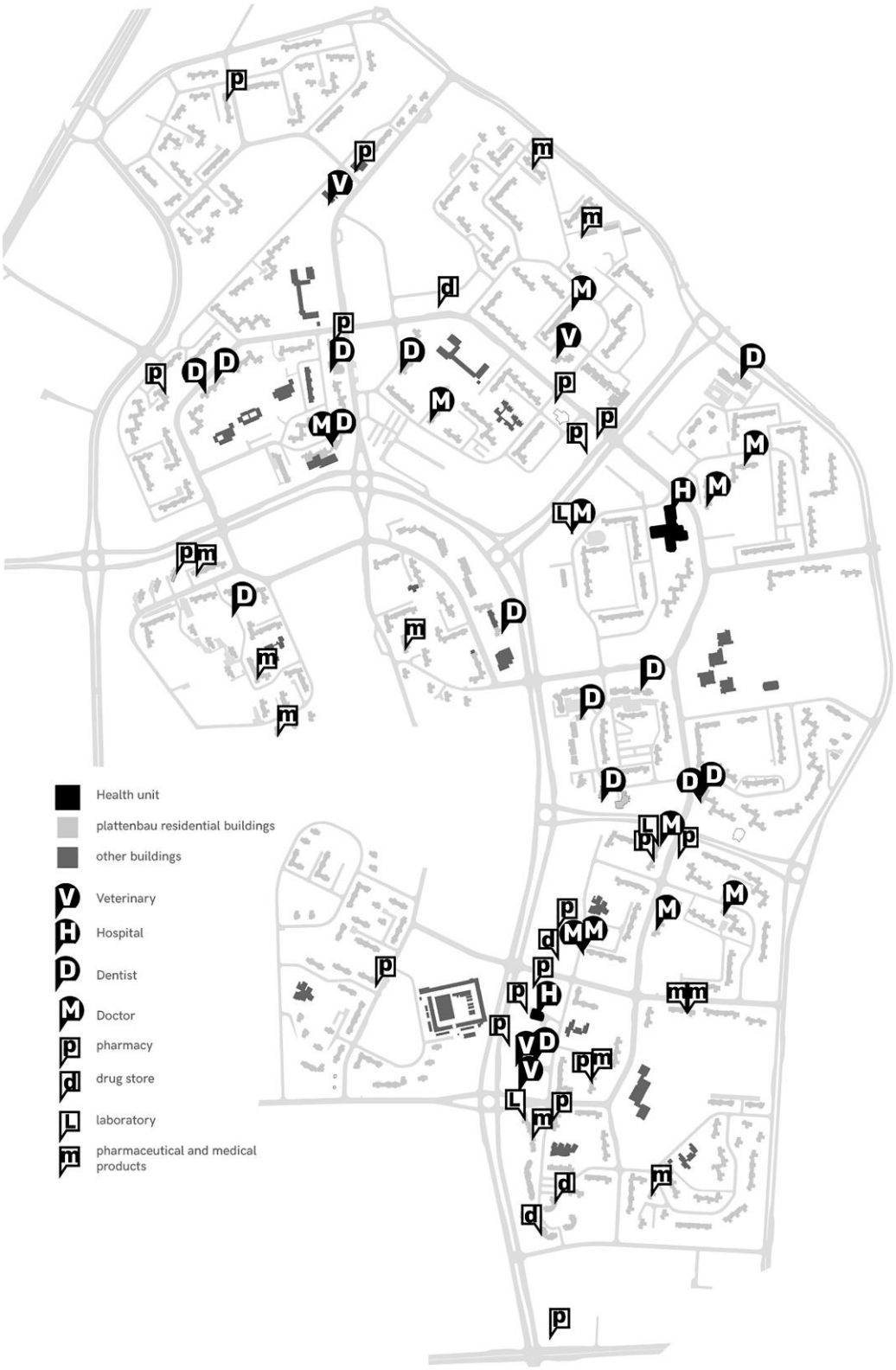

Figure 6. Fully developed infrastructure. (Author: Nina Toleva-Nowak)

The still ongoing intense development of the region can be traced in an online platform showing all pharmacies and drugstores and giving information about their specifics – whether the pharmacy is municipal or private, or whether it is working with the National Health and Insurance Fund, or whether there is a pharmacist preparing special medications, etc. Since October 2016 two more pharmacies opened in "Trakiya" reaching the current number of overall 16 pharmacies and 4 drugstores. In conclusion, during the past 28 years not only the social and the built environment, but also the medical coverage had undergone a major transformation – a fully developed 3 stages of medical coverage emerged - general practitioners, specialists and hospitals. The enrichment of health infrastructure from one hospital to more than 45 medical offices of general practitioners, specialists, dentist, one new private hospital, is accompanied by abundant supplementary medical infrastructure, such as drugstores, pharmacies, laboratories, dentist offices, optics, etc. All these offices and units are results of the major transformation in the urban and built environment – the emerging new offices and facilities are most often located in reconstructed and transformed apartments, either on the first or upper floors, less often in the basement. They have their own individual entrances and in turn transform the adjacent environment as an open-air waiting room. Very rarely these facilities are located in newly built separate buildings.

This medical infrastructure is a strong support for a good social infrastructure which includes: a variety of social housing facilities, community centres, senior clubs and a programme for social assistance. Some of these activities are co-financed by the Municipality, the Red Cross, European Social Fund. During the field research a very peculiar social practice was spotted, which is unique for "Trakiya" - adults and elderly residents and patients gather in front of the repurposed medical offices (former ground-floor apartments) with external staircases. There they wait for their turn, bask in the sun, or just gossip, observe who is visiting the nearby drugstore, discuss their health issues and share their experience about medication and natural remedies (Fig. 7).

Figure 7. Socializing in front of the medical office (Photo: Nina Toleva-Nowak)

Along with the medical infrastructure, there is a sufficient social infrastructure (Table 1), including social housing for elderly with physical disabilities, social housing for elderly with mental disabilities,

social canteen, community centres, senior clubs and programs for social assistance. Most of the facilities provide options for cultural activities and even some tourist events, healthy lifestyle talks, cultural trips, hiking trips. The seniors are involved in a variety of artistic rehabilitation and medical help. A few of the social housing facilities offer their residents/patients to practice some gardening skills and to grow their own flowers and veggies, with the firm belief that these activities are beneficial for their physical and mental health and nutritional status.

Table 1. Available social infrastructure and conditions in "Trakiya" (Author: Nina Toleva-Nowak)

Facilities / Conditions	Social housing for elderly with physical disabilities "Hadzhy Gyoka Pavlov"	Social housing for elderly with mental disabilities "St. Vrach"	Temporary housing facility
Number of beds	80	58	10
Allowed period of stay	permanent	permanent	Up to 3 months
Food provision	dietary	dietary	regular
Medical care provision	medical and rehabilitation care	medical and rehabilitation care	medical care
Additional social services	social assistance	social assistance	social service
Cultural activities	cultural events, trips, vacations	cultural events, trips, vacations	cultural service
Additional activities	green garden with flowers and veggies	yard with swimming pool, tennis court, football playground, etc.	none

Community

Considering the above mentioned models of common open-air spaces and the sharing of spare time, we may speculate that these phenomena represent a consequence of the traditional model of the Bulgarian cities – the century-old principle of sharing common values and rules[21]. Thus, is was not surprising that most of the local residents kept repeating one phrase: "One building is one village, one section – is our neighbourhood". The process of meshing the private sphere into public areas in the spirit of good neighbour relations serves as an indicator of the willingness of the citizens to participate in various activities bettering the quality of the immediate built environment and communal life.

The communities manage to solve most of the emerging problems by themselves via negotiations and compromises. The sense of communal integrity that was so strong during the 1980s and that was lost during the 1990s, has recently started to emerge again. A good indicator for the community spirit are neighbourly interrelations and the quality of communication. The interesting and rather surprising results showed that the people with children assess their interrelations with their neighbours better (55% rate as excellent, compared to 32% in the child-free group). The same trend continues in the assessment of the quality of the communication itself (55% of the people with children rate the quality of communication as excellent compared to the 36% in the child free group). These neighbour interrelations affect not only the community spirit, but also the citizen activities and the social causes the residents organize or join. While people with children prefer to join activities like cleaning the immediate surrounding of the buildings and cleaning the spaces and the lawns between the building blocks, the ones without children are more likely to join causes related to charity - collecting money, food or clothes for the needy. Overall the proportion of people that have joined or are willing to join is bigger compared to the people without children – 38% have joined and 26% are willing to join a cause, while the percent among the people without children is 17% who have joined and 35% willing to join.

These practices of bettering the environment also spread the good example of the shared responsibility and affect more and more areas in the district. (Fig.8).

Figure 8. Community spirit. (Photo: Nina Toleva-Nowak)

Complaints and Responsibility

Among the top five complaints of the people with children are the poor quality and the deteriorating spaces and lawns between the residential buildings; the lack of enough parking spaces, the lack of public drinking fountains, the poor quality of the streets and the sidewalk pavements and the lack of public toilets. On the other hand, among the top five complaints of people without children are the lack of enough parking places, the poor quality and the deteriorating spaces and lawns between the residential buildings, insufficient cultural events, the poor quality of the street and sidewalk pavements, and the lack of entertainment in the neighbourhood.

Among the listed virtues of "Trakiya" were the wide boulevards and the good connectivity of the transport infrastructure, the technical infrastructure, the green spaces giving a certain sense of freedom in the district, the sufficient number of kindergartens and schools, the mixture of different supplementary function and the sense of community spirit, the decreasing crime rate and the sense of security.

What was particularly interesting was that the people with children were more willing to share responsibility with the Municipality for the development of the neighbourhood in comparison with the people without children, yet they were more hesitant about filing complaints to the Municipality.

Concluding Remarks

In conclusion, the district gives sufficient opportunities and life-style options for families. Proof for that is that 49% or the people who have children state that the district fully satisfies their needs, compared to the 31% in the child-free group who stated the same. On the other hand, the observations and the analysis of the questionnaires showed that the people are more active where there is a lot to be done by them and when the local authorities are involved in the betterment of the environment as well, i.e. , when the responsibility for the development of the district is shared. These citizen initiatives and activities are also fuelled by the sense of pride, the real empowerment, the feeling of personal value and self-

importance for being responsible for transforming the environment into one of the best districts in the city.

"Trakiya" was planned and constructed for young families with children, for active people. With the gap of approximately 20 years in its development, currently it has achieved this self-sufficient state of environmental well-being, it has attained the status of good place to raise ones children, creating a happy, lively, vivid urban environment, not seen in other pre-fab socialist residential complexes. A major proof for that is that currently 64% of the people with children would recommend their friends and relatives to move to "Trakiya" as well (compared to 54% from the child-free group). Additionally, when asked if they would accept an opportunity to leave "Trakiya" for another part of the town, only 19% of the people with children would say "yes", compared to 46% of the child-free people.

And even though there are still a lot of societal and environmental problems in the neighbourhood, they are all manageable with a strong will and pro-active behaviour. We may even conclude that precisely the challenges throughout the years have been the spark that ignited the community spirit, the reason that forced the families to step up and transform the incomplete socialist almost dystopian district into a vibrant and integral part of the city. Thus, the most key factor for this metamorphosis of the district are its active citizens – with their hopes, and dreams, with the inextinguishable belief that tomorrow will be better, with their will to make it better for generations to come.

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